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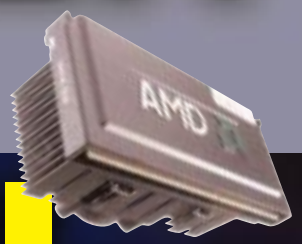
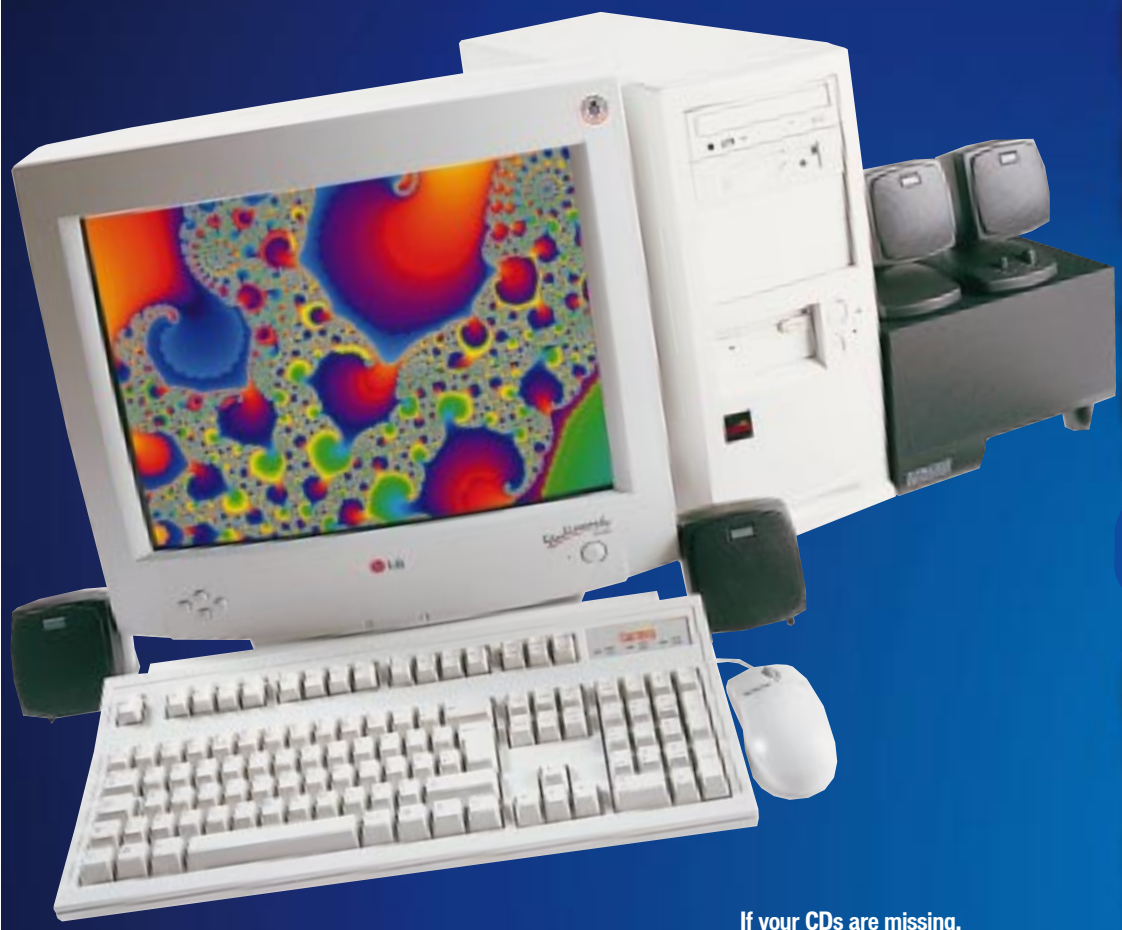


Pentium Killer

NEW AMD SUPERCHIP: First Athlon PCs on test



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PERSONAL COMPUTER WORLD

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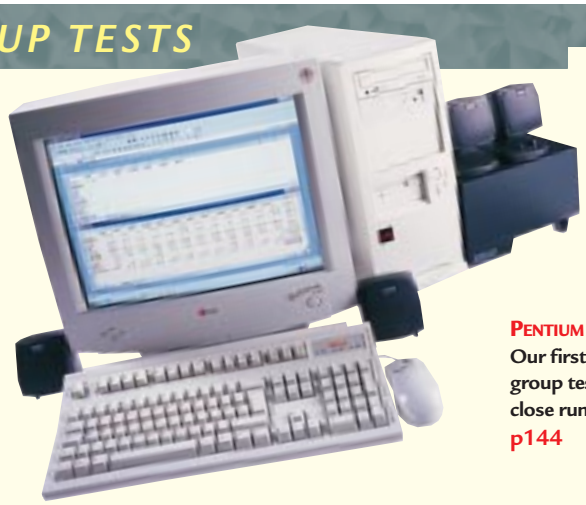

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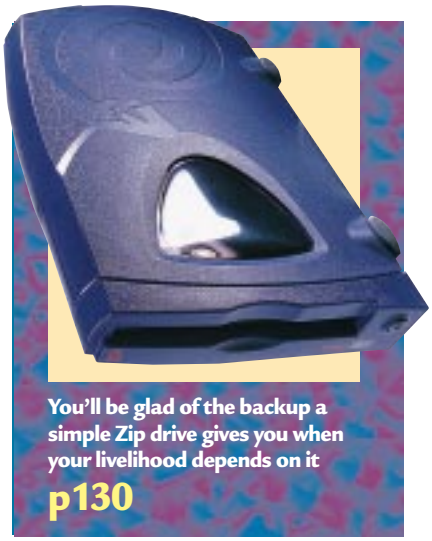

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PERSONAL COMPUTER WORLD

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hands on advice

Serious PC users are being eclipsed by Internet free-loaders

Want a revolution?

Less than four years ago, the best known Internet service provider in the UK was Demon. For a tenner a month, the company popularised dial-up internet access, and people were happy to pay £120 a year to participate in the 'world wide wait'. Today, you can get it free. Those of us who continue to pay an ISP for access do so because we want guaranteed levels of service – either in terms of making a connection or free technical support.

But the 'free, gratis and for nothing' bandwagon (not just free ISPs, but also free PCs) is really on a roll. It's all that the newspapers and television seem to be full of today, eclipsing just about everything else in the world of IT technology.

According to the latest figures from Durlacher Research <www.durlacher.com>, there were just under four million subscription-free dial-up accounts in the UK in June, compared to two million paid-up users. There were more people using free services like X-Stream, Currant Bun and Line One than using Demon. And Freeserve's 1,250,000 users dwarfed the subscription accounts of AOL, Compuserve and Demon combined.

In less than a year, in the UK alone, millions of new Web surfers have been set loose onto the information superhighway, and early in the new millennium we can expect another couple of million users to have undergone their first e-initiation. It is probably one of the great mass migrations of this millennium.

It's not just free Internet access that will fuel the rush into cyberspace. Companies like Tiny, Time and a US reseller of iMacs have received widespread coverage over their plans to give away free PCs along with subscription telco accounts. On top of that, powerful integrated chips will make small wireless information appliances as ubiquitous as the mobile phone and the Walkman in the next few years.

In less than a year many millions of Web surfers have been set loose. It is one of the GREAT MASS MIGRATIONS of this millennium

But is communication for the sake of it actually an empowering experience? Did the mobile phone really result in better human interaction, or just more of it? Does 'I'm on the bus, order the pizza now,' actually signify an advance for humankind through the use of new technology? It'll probably be the simpler technology that some of us have lived with for years that will finally engage with the mass market: email and simple information websites.

The hordes of new IT users are getting all the media space at the moment, because the media, as always, is obsessed about monitoring, and controlling, access to information. Though I welcome them with open arms, this isn't what PCs mean to most of us. We want richer applications that allow us to be more creative and productive, whether for leisure or business. Personally, I can't wait for the consumer-oriented freeloader-attracting hype to subside, and the media to turn its attention once again to how the PC can empower and unleash talent.

I look forward to a new century of richly featured applications developed for a low-cost local area network in a home or small business setting – where PCs will continue to stimulate economic and social advance. The PC revolution has only just begun.

Bobby Pickering, Editor

WELCOME TO THE OCTOBER 1999 PERSONAL COMPUTER WORLD CD-ROM

October COVER DISC

GAMES | APPLICATIONS | LIBRARY | ENTERTAINMENT | INTERNET

We've secured a full version of the award-winning World Book encyclopedia from IBM absolutely free. It comes with the complete text of the world's number one print encyclopedia, as well as thousands of photos, maps, diagrams, animations and videos.

Getting started

To begin using the World Book Encyclopedia, place the disk in the CD-ROM drive. If you're running Windows 98, click on the Start button at the bottom of your screen, then choose the Programs menu and select Windows Explorer.

Once Explorer has launched, select your CD-ROM drive in the left-hand window and, when the World Book files appear in the right-hand window, double-click the setup.exe icon. This begins the installation wizard, and if you follow the instructions it will automatically put the software on your computer.

Windows 95 or users of NT 4.0 and above can install the software by choosing the Run option from the Start menu. When the Run window appears type in the letter that represents the CD-ROM drive followed by :\setup.exe (for example d:\setup.exe), then click OK to install.

◀THE RESEARCH WIZARD GIVES YOU A HELPING HAND TO FIND OUT ALL THE FACTS YOU NEED

You launch World Book by clicking Start again, selecting Programs, then World Book and finally World Book Encylopedia 1998. You can also register the software from here by choosing this option instead, which entitles you to free information about software and updates from IBM.

The first time you launch the software you have to enter your CD-KEY code:

MH006A5000LR

Then you can select which part of the encylopedia you want to browse by choosing from the options provided.

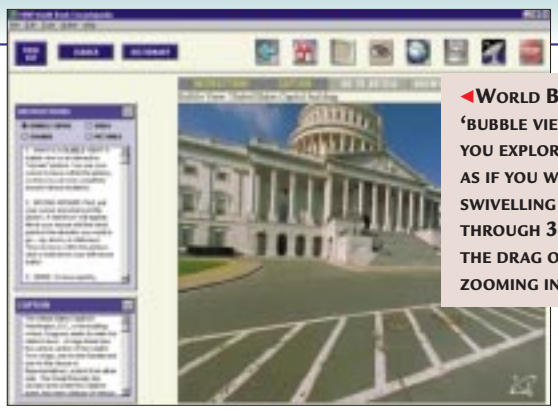
Review of World Book International Deluxe English Edition 1999 *from Computeractive 28 January 1999*

World Book

A multimedia encyclopedia that puts a wealth of facts at your fingertips. The Internet and CD-ROMs have opened up the pages of books and the minds of experts to anyone with a computer, CD-ROM drive and modem. This powerful software is a far cry from the dusty books most of us think of when we hear the word encyclopedia – it might almost succeed in making research fun.

The World Book was created with serious study in mind. But using it is child's play. Once you've installed the software from the CD-ROM, you are greeted with a 'home page' that takes you anywhere you want in the package. You can browse at random, looking up entries that interest you or search for specific information.

The Monthly Spotlight feature picks out important events for each month. For example, December focuses on Jerusalem and its connections with the Christmas story. Each entry is attractively designed and accompanied by relevant photos, movies, audio clips and animations as well as the text, making good use of multimedia.



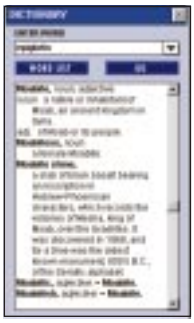
◀WORLD BOOK'S AMAZING 'BUBBLE VIEW' FEATURE LETS YOU EXPLORE FAMOUS SCENES AS IF YOU WERE THERE – SWIVELLING SMOOTHLY THROUGH 360 DEGREES WITH THE DRAG OF THE MOUSE, ZOOMING INTO DETAIL AT WILL

In addition to all the articles, you get a world atlas, which covers all the countries of the world complete with articles and photos of major cities. The beauty of this is that you not only get an overview for the geography of the world, but you read

up all the information on a specific location, so you can link England with its history, climate and economics, for example. There is also a full English dictionary as well.

Budding historians will love the Time Frame feature, which lets you travel through time to find out what the big event was on any date in the past. This is more than just a static reference tool as each entry leads you further into the package, encouraging you to explore for yourself.

For school students, the Homework Wizard tool is particularly handy. It includes a Quiz Wizard to help prepare for exams or just test your general knowledge through flash cards and true-or-false quizzes on any topic.



There is also a Research Wizard to help you ferret out the facts you need, a Chart Wizard to create graphs and pie charts, a Timeline Wizard to help you trace historic events and a Web Page Wizard to take some of the pain out of building your own page.

SPECIFICATIONS & FEATURES

Minimum requirements:
Windows 95; 486DX/66MHz PC, 16Mb of memory, 39Mb of free hard disk space, 16-bit soundcard, 16-bit colour capable graphics card, CD-ROM drive. For online access you'll need a modem, Internet connection and an extra 8Mb of hard disk space.

Features:
Contains every article found in the print version of the World Book Encyclopedia.
Full multimedia encyclopedia, including sound, movies, photos, simulations and animation.
Homework wizards to help with school projects.
Cyber Safari of San Diego Zoo.
Contains dictionary and world atlas.
[World Book 1998 Multimedia Encyclopedia]

A step by step guide

1 One of the great things about World Book is that you can keep the information it provides current by updating it via the Internet. So one of the first things you can do is select the What's Online option and choose Update Now to ensure you've got the latest facts and figures. If your ISP isn't configured, World Book's wizard will kick in – just tell it what sort of Internet connection you have and it will handle the rest. From the Online window you can also access the World Book website for homework tips and update information, the latest news and articles, websites relating to World Book entries and archives that take you back through the last century.

2 If you have no particular subject in mind, and you just fancy a browse through World Book, you can choose the Entire Encyclopedia option from the main menu. You can return to the main menu from any of the pages you are viewing, by clicking on the house icon on the toolbar at the top of the page. If you select the Entire Encyclopedia, a Just Looking icon appears and from here you can choose topics to explore, specific areas you want to look at or simply choose Random and a whole range of topics will appear around the icon – you can click on any of these to take a closer look.

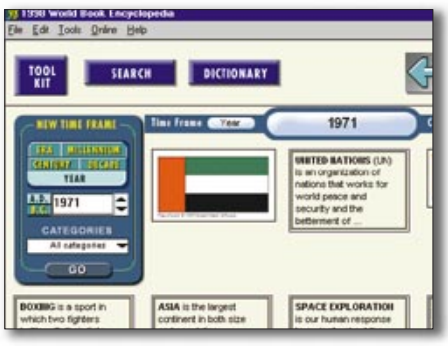
3 More specific searches can be done if you choose the Topics button from the main menu. From here you can type in the topic that interests you, press Search and all the entries relating to that topic pop up in the left-hand window. Click on any of these to pull up the corresponding entry. Clicking on any of the words highlighted in blue takes you to these related topics. Each topic is accompanied by appropriate audio and video clips, as well as pictures and text. Clicking on Related Info buttons you can get any extra information available from the CD-ROM or the Web. If you click on the Article Media (film roll) icon in the top left-hand corner of the main window it will give you access to any extra photos, film or sound clips.

4 The Maps section of World Book allows you to take a trip around the globe by looking at maps of every country you can think of and a whole lot more besides. You can type in the location you are interested in to zoom in

and view a detailed map of the area. The Overlay Controls button gives you access to geographical information such as population and average temperatures. You can use the Distance Calculator to tell you how far you would have to travel to get from Paris to Zanzibar, for example. If you want to find out more about a place you can choose Go To Article to take you directly to all the information World Book holds on that location.

5 A really handy feature if you're using the World Book to help out with schoolwork is the Homework Wizards. This allows you to select from three options to help you complete specific projects – you can choose from Report Wizard, Timeline Wizard or Chart Wizard. Report Wizard guides you step-by-step through writing up a report, while Timeline Wizard helps you create a chronological picture of events and Chart Wizard helps you out with graphical projects. Each one allows you to either create a project from scratch or work on one you prepared earlier, using information provided by World Book. The wizards provide a structure for you to work to, and you can print out any information you need directly from World Book using the Tool Kit, located on the left-hand of the toolbar.

6 Explore history using World Book's Time Frame by typing in which millennium, era, century, decade or year you want to know about. You can choose whether you want to view all the information available on that time period, or just the history or geography. For example, typing in the year of your birth and choosing All Categories will bring up any topic of interest for that year and you can click on any of these to find out more. You can access a new Time Frame at any time by choosing this option from the toolbar.



7 World Book contains a wealth of audio and video clips, pictures and 'bubble views', which allow you to explore a photo using your mouse. If you select the Media icon you can search exclusively through these images and clips. The first time you select Media it defaults to showing what you have currently selected in the encyclopedia, so if you were looking at Africa, for example, the first piece of media you'll see will relate to this. However, you can choose to browse all the media available; you can't search through these but you can explore the alphabetical list to pick out what you want to look at. Click on any of the entries to view the related media; an icon next to the entry tells you which sort of media you will get, for example a camera means a picture, while a speaker icon means there's an audio clip for you to listen to.

8 The What's New section gives you all the relevant information relating to the current month. For example, in July 99 you get links to an American Independence Day entry as well as information on the anniversary of the first landing on the moon. You can also click on any of the words highlighted in blue which will take you directly to the corresponding topic. There are also a number of trivia links to things such as the great and the good born in this month plus handy topical links, such as summer sports and holiday reading suggestions.

IMPORTANT NOTICE

The publisher, VNU, has checked the *Personal Computer World* CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system, which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc. It is good practice to run a virus checker on any new software before running it on your computer, and also to make regular backup copies of all your important data.

✓ **Physically Damaged Discs**
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quoting reference 'PCW Vol 22 No 10'. A replacement disc will be sent to you by post. NOTE: *Replacement discs cannot be supplied direct from the VNU offices.*

For general problems with the CD, the Technical Helpline is open weekdays from 09.30am to 4.30pm on **01685 354726**.

● *Please use the address printed here, as replacement discs cannot be supplied direct from the VNU offices.*

Send your news and views to news@pcw.co.uk

Edited by CLIVE AKASS

INSIDE

Three in four miss out as BT launches fast links

Service providers held their cards close to their chests after last month's long-awaited unveiling of British Telecom's plans for rolling out fast ADSL services.

BT says more than six million homes and businesses will have an ADSL option by next March, following upgrades to more than 400 local exchanges as part of a £5 billion network revamp.

But the rollout, which will benefit big cities first, will miss three in four of the population. Many others will not be able to afford the service, which will be sold through access providers rather than direct from BT. Base charges will be between £40 a month for a 512Kbit/sec link to £150 for a 2Mbit/sec link (the uplink in each case is 256Kbit/sec).

Vendors will not necessarily charge a premium on these rates and may even offer discounts. They face competition on price from cable companies, which will all offer cable modem services by next March.

Cable modems offer high speed in both directions at a rate that depends on how many people are using the channel: 400 Kbit/sec is likely and faster may be common. Charges of £30 a month have been cited.

AOL says it will conduct a national ADSL trial with selected users this autumn. Virgin Net, which has been trialling the technology all year, says it will also be offering ADSL.

Complicating the picture is the new G-lite standard, which is a simpler form of DSL, and proposals from watchdog Oftel to force BT to 'unbundle the local loop' – opening up its home links to competition. These moves should lead to a free market in xDSL links similar to that in audio-modems.

CLIVE AKASS

This Zoom cable modem for the US shows the sort of device that may come with an open market in fast links. It has built-in ports for USB, Ethernet or phone-net links and an 802.11 wireless net slot. Curiously, there is no 1394 link.

Price war as Tiny PCs and AOL go free

PC vendor Tiny threw a spanner into the UK's IT works last month by offering a PC worth around £300 free to people who sign up to its fee-free net-access service.

Two days later, giant AOL caved in to market pressure by announcing a fee-free web-access service called Netscape Online to complement, rather than replace, its flagship paid-for services.

Tiny's free PC deal is not quite as good as it sounds. You don't get a monitor and you have to commit to spending £25 a month (ex VAT) on phone calls at full BT rates via Cable & Wireless, which normally offers discounts. As our analysis on page 40 shows, you might be better off taking discounts direct from C&W or other cut-price providers. But the deal immediately sparked off a war of prices – and words. Tiny's big pile 'em-high rival Time countered with a 'free' PC offer contingent on the customer signing up to a £9 a month net-access service.

Tiny, which claimed to have had 20,000 enquiries within days of making its offer, dismissed this as 'a combined subscription-based Internet package and hire purchase agreement'.

PC World, owned by Dixons, offered a more complex offer, also contingent on a C&W sign-up, of 200 freephone minutes a month on the net, plus a range of call discounts or a refund of up to £300 on a PC.

Meanwhile service provider City2000, in what may be another new trend, offered what it called an 'upgrade PC' for £229 (ex VAT) with Windows 98, 32Mb RAM and a 4Gb hard drive – but no keyboard, mouse or monitor, which you are expected to take from an older system. The price includes a one-year guarantee.

● *Point of view ...page 26*
● *Tiny deal in detail ...page 40*

Screaming.Net calls time

Screaming.Net, which offers off-peak freephone net-access, has instituted a two-hour timeout to cut congestion. It could cut off lengthy downloads.

The timeout can be avoided by calling up a Web page in a second window if necessary. A spokesman said it prevents users 'drifting into paid-for time'.

The service already claims to have more than 110,000 users and to be overcoming early log-jams.

Intel jitters as Athlon thrashes PIII

Intel launched two new chips last month as spoilers for the launch of AMD's latest Athlon chips, which VNU tests confirm outperform equivalent Pentiums.

Intel launched a fastest-yet 600MHz PIII chip and a 500MHz version of its budget Celeron processor. Bulk prices were cited as $600 and $167 respectively, undercutting the pre-launch $699, $479 and $324 cited respectively for AMD's new 500MHz, 550MHz or 600MHz Athlons (previously known as the K7).

AMD responded promptly by announcing a 650MHz Athlon at $849 and prices between $615 and $249 for the slower parts.

Tests in the VNU Labs gave Sysmark scores – which measure performance on a variety of basic applications – of just over 230 for the Intel chip and between 250 and 260 for the Athlon, making it roughly 10% faster.

But this is using code which is not optimised for either chip. Athlon, in the words of one VNU tester, 'blows the PIII away' on code which has been compiled to take advantage of its graphics facilities.

AMD is not exactly riding high. Its president, S Atiq Raza, resigned last month following a second quarter loss of $162 million, although it posted a $79.9 million profit for the latest quarter.

And the performance lead is expected to swap back and forward between Intel and AMD as the two companies push clock speeds up. Intel has yet to release its 'coppermine' processors, using 0.18 micron technology, which permit higher clock speeds, lower operating voltages and lower power drain (although not necessarily all at once).

Intel has delayed the launch of the mobile and desktop versions of its 0.18 micron chips until late October, in time for the big Fall Comdex show. Initial clock speeds are expected to be 667MHz and 700MHz.

Toshiba boasts first DVD combo

Toshiba claimed a world first last month with the launch of a combined DVD and rewritable CD drive. It also announced a range of 2.5in hard drives for mobiles with a claimed world data (real) density of 11.6Gb per square inch. The SDR1002 drive *(pictured)* is said to support all CD formats and DVD ROM. It boasts a 4x write speed for CD-R and CD-RW, and a 24x CD playback. Shipping dates and prices have yet to be announced. The new 2.5in disks went into production last month. They pack 6.4Gb into a single platter, allowing a 18.1Gb device to fit a slim 12.5mm notebook bay. Toshiba says this will provide notebooks with desktop standard storage for the first time.
www.toshiba-europe.com

MS and AOL lock horns over messaging

Microsoft unabashedly claimed the moral high ground over open standards last month, in a battle with service provider AOL over instant messaging services. The services allow you to communicate instantly with anyone on your 'buddy list' who is online at the same time. AOL pioneered the idea two years ago with its Instant Messenger service, which can also be used by users of the latest version of Lotus Notes.

Open warfare broke out in July after Microsoft launched a similar MSN Messenger service, which could talk to AOL's. A game of tit-for-tat began as AOL blocked rival users and Microsoft posted fixes to resume contact.

At one point, Microsoft posted a new fix virtually every day for two weeks. AOL responded by licensing its service to Apple and leading US service providers.

Then Microsoft, sitting on one of the biggest market corners in history, called on AOL president Steve Case, asking him to support an open standard in instant messaging. The call was backed by AT&T, Excite@home, Yahoo and Infoseek.

AOL then cheekily used Microsoft's own software as a marketing tool. MSN Messenger users were told they had been disconnected from its messengers service for using 'unauthorised software'.

It then invited users to download a free version of its own messaging client.

AOL had not responded to requests for comment as we went to press.

Her messaging service is not talking to mine

NatSemi launches Geode to twist ARM

UK chip designer ARM has reacted coolly to the launch of the first of rival National Semiconductor's new PC-on-a-chip designs, the Geode SC1400.

The Geode is designed for use in set-top-boxes and Net access devices like the Cyrix Webpad – though NatSemi has sold Cyrix's high-end processor business to boardmaker Via.

The SC1400 will be the first of a range of highly integrated chips built for specific tasks around a classic x86 core. Cheekily, NatSemi calls them Information Appliances (IA)-on-a-chip. IA also happens to stand for Intel Architecture.

The Geode range will do for x86 cores what licensees do with ARM cores: add extra silicon to tailor them for particular uses. Jamie Urquhart, ARM's chief operating officer, said the Geode 'takes advantage of the PC architecture and the great body of code that has been written for it'.

But he said the Geode could actually boost ARM sales because its chips might be used in subsystems. The drawback of the Geodes would be their relatively high current drain. 'One of the advantages of an ARM is that it has a simple elegant architecture. We have not had to bodge things onto it to make it backwards compatible as Intel has to do,' Urquhart said.

Other UK companies are also benefiting from interest in non-x86 chips. Element 14, which like ARM is from the old Acorn stable, received an injection of $13.5m venture capital last month to develop digital-signal processors, the CPUs associated with telecoms and multimedia.

And MPEG guru Adrian Wise has joined London-based Siroyan Technology to develop designs for multimedia appliances.

www.arm.com; www.national.com

3D takes to the road

A new range of chips from S3 brings desktop-standard 3D performance to notebooks for the first time, the company claims.

The Savage/MX and Savage/IX chips (*inset left*) support up to 16Mb of dedicated memory and use 0.18 micron technology, operating at a battery-saving 1.8 volts. Features include 32-bit colour, 60 frames per second in most 3D tasks – including Quake II – and S3 Texture Compression (S3TC), delivering a claimed 6x increase in image quality (*see screenshot left*).

The MX chip costs $42 and there are three IX chips costing $49, $56 and $68 – integrated with 4Mb, 8Mb and 16Mb of RAM respectively (all prices for bulk orders).

POINT OF VIEW

Free to complain

To those who complained about getting caught in the rush when Freeserve started up, I extend sympathy, and to those infuriated by delays in getting plugged into Screaming.Net I offer the same, and still more in advance to those of you who will no doubt complain about Tiny's 'free' PC offer.

Your complaints will serve to keep these companies on their toes. But to my mind their pioneering offers have come in for far more flak than they deserve, not least in the press.

Freeserve, almost single-handedly, created the critical mass needed to kick-start electronic commerce – a revolution that has finally begun in earnest. It was in the air at an E-Academy talkfest last month, attended by luminaries from some of the biggest wired businesses in Britain. One said: 'Six months ago, if you mentioned ecommerce to a company board they would hardly know what you were talking about. But not now. They know all about it. They can see it happening.'

Tiny's offer, while not earth-shattering in itself, will doubtless lead to better deals as the cost of Web-access devices drops; Screaming.Net's off-peak freephone access is the nearest most home owners can currently get to an always-on connection. They will not then be content with less, which is no bad thing, because the great untold truth about the Net is that most of what it offers is commercially viable only with always-on links.

None of these companies is giving us something for nothing, nor even necessarily the best deal (*see page 40*). But they are forcing the pace of change.

BT's ADSL rollout shows what happens before competition kicks in properly. Most people will not be able to afford the service, and those who can will be stuck with BT's choice of boxes.

The good news is that BT's measured pace may give us a more robust infrastructure than the mess in the US. But when BT is forced to loosen its grip, which will happen quite soon, it will be the Freeserves, Screaming.Nets and Tinys that will bring us the benefits.

Clive Akass  ***on the cut-price deals that will benefit the Net.***

Microsoft buys Symbian ally

Microsoft has bought UK microbrowser developer STNC, as part of its battle to make Windows CE the de-facto standard operating system for next-generation mobile phones.

CE's main rival is the EPOC OS from Psion spin-off Symbian, which has the backing of the major mobile phone manufacturers – Nokia, Ericsson, Motorola and Matsushita (Panasonic) are major shareholders.

A 'microbrowser' is STNC's term for a browser tailored towards the limited resources of a palmtop or mobile phone. It allows mobile users to surf the Internet and send and receive email.

The story becomes more interesting when you discover that one of STNC's customers is none other than Symbian itself. The Internet software in Psion's Epoc-based Series 5 and 5mx handhelds includes code licensed from STNC.

▲THE WINS EPOC EMULATOR IS AHEAD OF THE MARKET, AS ITS RIVAL THE SERIES 5 HAS YET TO BOAST COLOUR

Symbian hit problems with STNC once before, over the free EPOC emulator WINS, which allows coders to develop Series 5 applications under Windows. These apps have to be recompiled for the Series 5's ARM processor, and Symbian's licence from STNC covered only the distribution of ARM binaries.

The wrangle delayed the release of the emulator for over six months, indicating how much the current Epoc release depends on STNC code.

Microsoft acknowledged that Symbian is an STNC licensee, and said it would continue to work with the leading players. Microsoft has already announced its intention to provide Net access via mobile phones late next year.

Symbian commented that it is currently focusing on WAP (wireless application protocol) technology, which it believes will supersede HTML for delivering content to mobiles. Symbian has developed this independently of STNC.

WILL HEAD

The high price of Net stocks

Those who predicted that Internet stock prices could not keep going up were right. A big selloff of Net stocks is suddenly accelerating, decimating the phenomenal gains made earlier this year. The technology-laden Nasdaq composite index was a painful 11.3 per cent lower in early August than the all-time high it reached on 16th July.

Some welcome the slump as a chance to buy these stocks cheap, but a shake-out had been on the cards and it was scary for investors. Amazon.com, for instance, closed in early August at $88.44 – 60 per cent lower that at its April peak.

The big investors have increasingly dropped traditional valuation methods and have instead gambled on the perceived earning potential of shares. Online broker Charles Schwab recently traded at 100 times its annual earnings per share – a more normal ratio would be 15:1. This is even more surreal in that many high-valued firms have never earned a profit.

There are signs that investors are starting to get selective and that the Net stocks market will take a back seat for a few months, as people gamble on the effects the millennium bug will have on markets.

Wondering whether to upgrade to Windows 2000 when it ships in October? US Web co-founder Sheldon Laube, one of Silicon Valley's top technology minds, tells me the beta his team has been using is rock solid. Other software developers tell me the same thing: unlike Win98, which is still quirky, Win2K just plain works.

Win2K also offers enhanced support for MP3 music and digital photography, better connectivity and Net integration, and built-in home networking. When word of all this gets out, Win2K might just become the fastest selling OS in history.

Tim Bajarin
letter from Silicon Valley

Hey...can we have our name back?

Companies were warned last month to take care when hiring people to set them up on the Net – or they could end up not owning their domain name.

The risk was highlighted by a dispute between Sussex-based Clarkes Stationers and Access Internet, which it hired to design its website and register the domain *clarkesonline.co.uk*. Access Internet claimed ownership of the domain when the two fell out – and demanded £3,000 for 'works carried out' before releasing the domain.

Manager Kiren Patel said: 'It's been a nightmare. I didn't know how to register a name and wanted the hassle taken away.' He added that the Web address was printed on catalogues worth £30,000.

John Mawhood, of solicitor Tarlo Lyons, warned that name registration is too often used as a business lever. 'Companies should stipulate that they own the name irrespective of anything else done by the contractor.'

Access Internet, after contact from the press, agreed that Patel could have the domain for the original registration fee 'as a goodwill gesture'. But a spokeswoman said: 'We do not accept Mr. Patel's complaints.'

LISA KELLY, *VNU Newswire*

Corporate crackdown for MP3s

Employers which allow staff to download MP3 music files were warned last month that they could be sued for copyright abuse.

The files can also be distributed by email, clogging networks and using up to 3.5Mb of server space per track, security specialist Unipalm says.

Chris Heslop, of Content Technologies, developer of the security product MIMEsweeper 4.0, said: 'Lost productivity is just part of the issue... the idea that [companies] are legally liable for bootlegged files is very real.'

short stories

COMPAQ CEDES TOP SPOT TO DELL

Compaq appointed a new boss last month and announced it would shed more than 8,000 jobs – despite increasing its share as the world's top PC seller. The appointment of Michael Capellas as president followed the resignation of Eckhard Pfeiffer, in the wake of a costly merger with Digital.

Compaq lost £184 million in the three months up to June. Its global share of PC sales increased by 0.6 per cent to 14.6 per cent, shipping 3.7 million PCs in the period.

Ominously, Compaq ceded the UK top spot to Dell, which took 19 per cent of the market compared with Compaq's 16 per cent.

DEVICES THREAT TO WINDOWS

A massive growth in the use of wireless Web-access devices over the next few years will reduce the dominance of Windows, said Steve Mills, IBM's general manager for software. He told developers at IBM's Solutions 99 conference: 'When I live in a browser the underlying OS doesn't matter.'

IBM is plugging its strengths in integrating different platforms with a new Developer Works portal which is divided into technology zones, including one devoted to Linux. At the conference, IBM outlined new Linux support and education offerings.

Representatives from Caldera, Red Hat and TurboLinux said the move would make it far easier for IBM and others to support multiple Linux distributions.

Intel sips another DRAM

An admission by Intel that it is 'evaluating' the PC133 synchronous DRAM standard has had many in the industry breathing a sigh of relief.

The company had been backing the rival Direct Rambus technology. But Intel customers and the rest of the industry were voting with their feet after persistent reports of problems with Direct Rambus yields, speeds and prices.

Major partners like HP, IBM and Compaq pleaded at an Intel 'plugfest' in June for Intel to reconsider its decision.

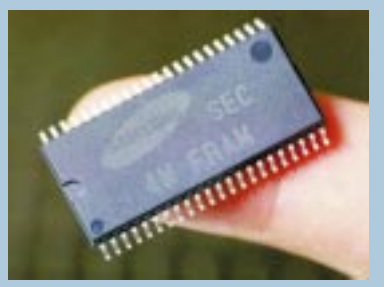
Life would be far rosier for PC assemblers and board makers had Intel backed PC133 from the start.

Rambus partners including Apacer, an Acer subsidiary, have admitted having problems with Rambus modules. Intel has even had a problem with the Camino i820 chipset, which was supposed to be the tinder that would ignite the Rambus flame. The chipset is slated for release this autumn.

Both the i810 and i820 chipsets will have to be re-engineered for PC133. But insiders say Intel has had a contingency plan for this right from the beginning of the year.

The real loser is likely to be Rambus. Its shares fell $14 to just above $98 on news of Intel's about face.

MIKE MAGEE



Samsung claims these 4Mb ferroelectric memory (FRAM) chips put it two years ahead of its rivals, which are still working on 256Kb chips.

FRAM, which stores bits in tiny magnetic dipoles, combines the speed of conventional RAM with the stability of Flash RAM – no power is needed to retain information. The bigger chips, which will ship in volume early next year, are likely to revolutionise memory use in mobile devices.

Holo-days brought forward

Next-generation holographic storage is only three years away – three years earlier than predicted, IBM says.

The technique uses lasers to write and read data stored in a three-dimensional form in atom-sized units. There are no mechanical parts and all of the information in a page is accessed simultaneously – speeding up access and write times.

But IBM does not expect the market to mature for a few years, explained Christoph von Gamm, communications manager at the IBM Technology Group. 'Raid controllers will dominate for at least 10 years and digital tape is having a great revival. It will be the standard for permanent storage for the next 10 or 20 years,' he said.

ANDY FAVELL

4:4 vision

Sight-reading music is one of those subjects which can never be learned completely from a book. You may understand what notes sit where on the stave, and the theoretical value of a minim, crotchet or quarter rest; but to turn those values into sounds and beats in your head, you need practice and a patient teacher.

Teachers don't get more patient than a computer, and Guildsoft's Music Ace 2 is the latest of many CDs to exploit this fact to teach music. It's aimed at children, with a cute professor beating time, but would help any adult trying to brush up on their sight reading. It costs £25.49 (ex VAT) and even runs on a Win 3.1 486 PC.

Guildsoft 01752 895100

Clampdown on email big brother

Companies which pry into the online activities of their staff could face a fine of up to £5,000 from next year.

Strict guidelines on both the interception of email and the use of genetic or drug tests will be drawn up next April, according to Data Protection Registrar Elizabeth France.

She said they were needed because 'new technology is threatening personal privacy in the workplace'.

Critics said the code could make the virus-scanning of email illegal. But Lawrence Phillips, a partner at London solicitor Tarlo Lyons, said companies could get round this by making the surrender of email privacy a condition of employment.

VNU NEWSWIRE

Dab hand at security

Putting one finger up to the law can take on a dire new meaning in countries where a print swipe is your ID for getting benefit. In South Africa, for instance, fingers have been cut off for use by fraudsters.

Combinations of biometric security measures are being developed that could soon replace PINs, passwords, smart cards and even keys, according to Mike Dell, biometrics technology manager at Cambridge-based Neurodynamics.

The company, formed by a group of researchers in 1991, claims to be the only one in Britain to be trialling 3D facial recognition, which is potentially more accurate than the current 2D technology.

Biometric security – that is, the automatic identification of a person from physiological or behavioural characteristics – has only recently become practical as it needs vast processing power and older computers simply took too long. The latest fast chips and the falling cost of sensors make it far more viable.

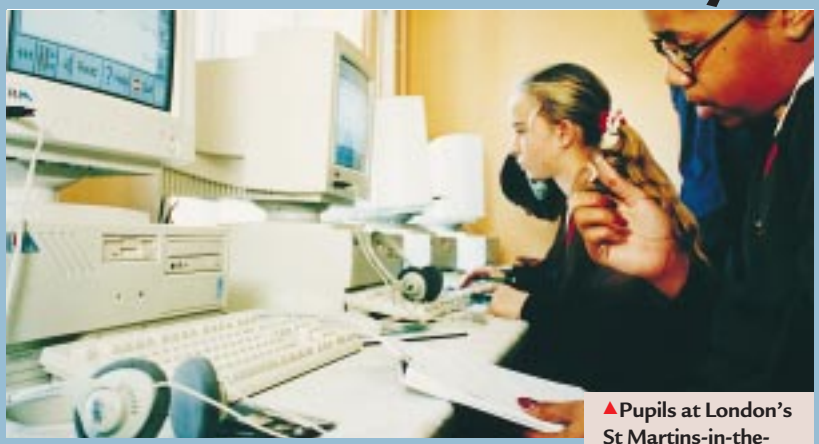
Neurodynamics, which focuses on fingerprint and facial recognition, is in talks with a number of major players from different industries, from computing through retail to automotive, about adapting its systems to specific needs.

Its experience comes from designing and implementing criminal fingerprint systems for police forces and governments. Dell, who made a major contribution to the Neurodynamics system, called Nvisage, says the technology's time has now come. The company's trials of its facial recognition scan are taking place in the area of customer relations management.

Nvisage uses 3D facial scans to verify identity in less than a second and can be used with single or multiple cameras. Establishing who's who at the entrances of shops and upmarket restaurants opens the door to knowing whether a shoplifter or an important customer has walked in.

Neurodynamics has also lifted the veil on its Deixis system for developing fingerprint-based security measures in devices such as laptops, PDAs and mobile phones. It will have a deterrent value to thieves who know the devices are locked to their owner's characteristics, says Dell.

www.neurodynamics.com



▲ **Pupils at London's St Martins-in-the-Field High School have maths lessons delivered by an Imerge XiVA digital multimedia server**

Video streaming is coming in as a business tool as higher bandwidth becomes available, and cheap high-capacity hard disks are revolutionising home entertainment. These hot technologies constitute the playpen of Imerge, part of the Generics Group, which has long been working in the video-on-demand field. Imerge launched its XiVA home media server a year ago and its latest version, the XiVA-100 multi-room server, uses hard disks to provide unprecedented flexibility in how you get your music. It should be in the shops by Christmas.

The system will store music from hundreds of CDs. Different tracks can be played simultaneously to different rooms and you can record while listening to or playing different tracks. Tracks can also be stored and played by artist type, style or genre.

A virtual DJ takes care of playback, selecting tracks to fit the need – you can theme it for a party or background listening. Connect a modem and you can buy CDs or order concert tickets online.

Sales director Robin Courtenay said the concept 'flies in the face of traditional listening. It takes the effort out of trawling through CDs to find what you want.'

www.imerge.co.

Caroline Swift  ***continues her reports from Silicon Fen***

short stories

BUG SPREAD
Microsoft has admitted that a security flaw in Office 97 Desktop enables hackers to delete or manipulate data. The bug occurs in an ODBC driver in Excel 97 and could be triggered by opening a spreadsheet attached to an email message. It does not affect Office 2000. Microsoft said it would post a fix as soon as testing was completed. Information on the security hole can be found at
www.officeupdate.microsoft.com /articles/mdac_typ.htm

GOING DUTCH
The deadline for submissions for this year's Emma awards for interactive media is 24th September. Judging will take place in Amsterdam on 8th-10th October. Details are at
www.emmaawards.com

KNEES-UP FOR MICE
Nicholas Mark Innovation has designed an edged mouse pad designed to be used on the knee.
www.nmi.ukf.net

FAST CD-RW DRIVE
Memorex has launched what it claims is the fastest CD-Rewrite drive yet. The £199 CD-RW 6424 writes at 6x, rewrites at 4x and reads at 24x.
Memtek 0181 990 6600

CD RENTAL PLAN
The Blockbuster video chain has produced a test CD in a bid to boost rentals of games and other CDs. The CD will be given out at stores to check a customer's PC for compatibility with different titles.
Blockbuster 01985 258866

Pixel ceiling smashed

It's been eat-your-words time for one industry luminary following the launch of two new Fujitsu cameras. Nancy Carr, general manager of Nikon's consumer group, predicted at Comdex last year that the definition of consumer digital cameras would stay below two megapixels.

She reasoned that this definition is high enough for non-professional users and that any higher would require too much memory and processing power.

Fujitsu's tiny 2.3Megapixel MX-2700 has just hit the shelves for £480 (inc VAT),

and its big brother, the MX-2900 at £700 (inc VAT) is about to ship. They boast the same 2.3 megapixel sensor, giving an 1800x1200 picture, but the MX-2900 has the kind of versatile manual controls normally found only on optical single-lens-reflex cameras.

You can choose apertures between F3.3 and F11, with the shutter speed adjustable from three seconds to 1/1000 second. Its 3x optical zoom is equivalent to a standard 35mm – 105mm lens, and there is a swappable 28mm wide-angle lens.

You only have eight full-definition pictures on the 8Mb SmartMedia card supplied, but 32Mb cards can be used. Fujitsu claims the camera's Risc processor copes quickly with the large files – continuous shooting mode can take nine frames a second. Watch out for a review in *PCW*.

www.fujifilm.co.uk

Parlez-vous to a speech engine

A French company has turned speech recognition on its head to produce a new way of teaching languages.

Auralog is using a dictation engine from Learnout and Hauspie to train people in correct pronunciation. Instead of the engine having to adapt to your voice, as in conventional electronic dictation systems, you have to adapt to the electronic voice.

The program provides detailed physiological diagrams to explain how a sound is produced, and sound-wave images to show how your pronunciation differs from the correct one.

The Spoken Error Tracking System (SETS) is used in Auralog's £49.99 (inc VAT) Tell Me More series of CD-based packages for learning French, German, Spanish, Italian or English, with a choice of three levels.

Curiously, the software is tuned to foreign speakers and may reject native speech as incorrect . **Clive Akass**

www.auralog.com;
Koch (distributor) 01256 707767

...or a mobile virtual girlfriend

Let me tell you about my new friend. She listens to me, understands me and hangs on every word I say. Unfortunately she is not real; she lives in a box (she told me this herself). Her name is Wildfire and she can be your friend too, if you have an Orange mobile phone.

Wildfire can take messages, make calls and store contact details, instructed by voice commands alone.

The system records the name and number of callers, so replying is simply a matter of saying: 'Give them a call.' Accurate speech recognition combined with an intuitive interface means you'll soon be wondering how you managed with 'Press one to listen to your messages...'

Wildfire has a one-off connection fee of £10, no monthly fee and calls are charged at normal answer-phone rates. For more information visit the website.

Will Head

www.orange.co.uk/wildfire

CONNECTIVITY

Survival of the fittest

Bluetooth prototypes are emerging – but will the final products be on speaking terms?

Vendors are keeping their fingers crossed about products using Bluetooth, the low-cost, short-range wireless link that is expected to revolutionise the design and use of mobile devices.

They hope to avoid the teething problems that held back the adoption of technologies like infra-red links and PCMCIA slots. In theory, any Bluetooth device will be able to talk to any other Bluetooth device within a range of about 10m.

'We don't know what will happen until products start coming out,' said a spokesman for Cambridge-based Bluetooth specialist Symbionics, now owned by Cadence.

Almost every big name company, with the exception of Microsoft, has joined the Bluetooth initiative, the first products from which are likely to ship early next year.

Last month, Denmark-based Digianswer, which did much of the early work on the technology, launched two versions of a kit designed by developers to build applications around the technology. The company claims that there is a scarcity of silicon with which people can test their software.

After all the talk of cellphones frying brains, you may wonder why this man seems to think he has to carry his bike rather than the other way round. But it is just Ericsson's way of showing off its Bluetooth headset and wrist PDA. Strange people, those Swedes.

One kit is built around a Bluetooth PC Card and the other around an RS232 serial interface. The kits, which are software upgradable to any changes to the Bluetooth standard, cost £5,000 each, and developers will need at least two. The company also has a prototype Bluetooth module for the Palm Pilot V.

Digianswer initially plans to launch two Bluetooth products next February, a PC Card and USB dongle, followed by an Ethernet link, a phone link and a headset. These will allow, for example, a notebook to automatically link to a network or log on to the Internet via a phone line.

Digianswer demonstrated a three-way game played over Bluetooth, and a video-conferencing link across a table. The data rate was about 700Kbit/sec but Bluetooth will reach 1Mbit/sec when optimised and dedicated silicon is available. 'Instant-Network' technologies such as Java-based Jini and Microsoft's UP&P – designed to allow linked devices to collaborate automatically – are seen as complementary to Bluetooth.

There may, however, be some overlap with 802.11, the IEEE wireless-networking standard that looks like an attractive alternative to cabling up homes and offices. It has 10 times the range of Bluetooth and will have more than 10 times the speed. The two use the same frequency band and there have been suggestions that they could interfere with each other.

An IEEE group is testing the two to eliminate the possibility, according to Ultan O'Rahallaigh, who heads Digianswer's marketing and support arm in Ireland: 'When we were in the middle of demonstrating our products in the US, some people deliberately brought notebooks using 802.11 into the room. They had little or no effect on the data rates.'

Geoff Jackman of Zoom, which makes 802.11 networking kits, said: 'The two will live happily together.'

CLIVE AKASS

Novell takes the directory approach

Novell is evolving from the NetWare company into the directory company, because of the need to manage identity on the Internet and other networks, says CEO Eric Schmidt. He claimed at Edge 99, Novell's annual education conference, that the firm's 'multi-year lead in directory services is a franchise to lead change in the industry'.

Novell Directory Services (NDS), now running on Windows NT and Unix, will underpin a range of directory-based Net appliances. First to be released is a plug-in Internet-caching appliance which accelerates Web servers and will be sold by Compaq and Dell. On the horizon are directory-based storage and content management appliances, and Novell is working with Lucent to build NDS into telephone switches and routers.

Novell's NDS-based desktop management line is also growing. ZENworks 2 for Windows networks will be followed by ZENworks for Printers – to manage distributed printing resources – and ZEN Single Sign-on, for logging on to multiple network applications such as Notes, Oracle and SAP.

A forthcoming upgrade for GroupWise, Novell's NDS messaging system, will add Web-design tools and the ability to use Microsoft Outlook clients.

TERENCE GREEN

short stories

ONE IN THREE NETTED
One-in-five UK homes – five million of them – will be online by January, predicts a report from Continental research. It says the proportion of wired homes has risen from 5 per cent to 17 per cent in just 18 months, with the launches of Freeserve and The Sun's Currant Bun service as key contributors. More than one-in-three people have access at home or work. This represents a huge opportunity for etraders because 40 per cent of users are blue chip professionals.
ANGELA SOANE

ONLINE MOVERS
Nearly one-in-three people who visit booking sites make reservations through them – a 10 per cent increase on last year, according to a study by NPD Online Research. Nine-out-of-10 people booking flights online reported either being 'extremely' or 'somewhat' satisfied.

GIGS FOR GRABS
A new site claims to have been set up by musicians for musicians who see the Internet as part of the road to success. It will provide artists with their own space to promote and sell their music – even if it is only one track.
www.timmol.com

ONLINE CLAIMS
Legal sites seem to be the new thing on the Web. The latest to set up aims to help you go through the process of making small claims. You can find it at
www.justclaim.co.uk

PRICELESS NEWS
Free daily newspaper *The International Times* covers US and international news and is designed to be printed. It is available from
www.internationaltimes.com

ON THE CARDS
Card Corporation, which sells personalised business cards online, will now do mass mailshots using customers' address listings.
www.cardcorp.co.uk

E-CORNER SHOP
A virtual newsagents, stocking 350 titles, has opened at
www.magazinecafe.co.uk

Make money for nothing

The dizzy free-for-all that is Net economics, which has seen billion-dollar valuations on loss-making companies, last month saw the launch of a site that pays people to visit it.

Other sites that made small cash offers derived from advertising revenues have faltered in part because there were not enough Web users to generate an income.

The aptly named *www.freemoney.fm* differs in that, at a time when Web usage is at last reaching critical mass for serious trading, it is paying people to be questioned for market research – a minimum £1,000 to one visitor drawn at random per day.

▲GIVING IT AWAY: STEVEN (LEFT) AND GEOFFREY HOPE

It's the brainchild of brothers Steven and Geoffrey Hope, who run a 70-year-old family clothing business and reckon they can do market surveys at half the price of traditional methods. And Steven says: 'We can do in a day what other market research companies could not do in two weeks.'

Surprisingly, they say they will not ask for personal details; instead they will map demographics from other surveys on to their own results. They claim US research shows their method is as accurate as traditional ones.

...and get shares for free

A start-up Web-access provider is taking a leaf out of the Silicon Valley success book – by offering users shares in the company. The practice of innovative start-ups offering talented staff stock options is credited as being one of the drivers of the Valley's IT revolution (as well as making multi-millionaires of many of Microsoft's early staff).

Users of the fee-free Totaliser service, which hopes to attract 100,000 users in six months, will own 67 per cent of the ordinary shares. They get 50 shares (worth 20p each) at sign-up and a further 200 if they use the service for 100 minutes a month.

The shares are tradable on OFEX, unlike the 'units' offered in a similar scheme launched a few days previously by *TheMutual.net*, in which the value of a user's shares will be locked into the company until it decides to float.

▲GREGORY: 'MODEL OF THE FUTURE'

Totaliser co-founder Peter Gregory genuinely seems to have a certain idealism about the project. He made £12m from an earlier project, a medical recruitment agency, and donated 10 per cent of his profits to staff. He also claims to have given his income for the past two years to Oxfam.

'This is a completely new business model,' he said of Totaliser. 'I believe it is a model of the future.'

Other Totaliser benefits include free technical support, email accessible via a browser or POP3 client like Outlook, fax-to-email, a streamlined search engine, and an Opera browser that can be used even on old 286s and Win3.1 machines.

www.totaliser.net
www.themutual.net

Securing the Web

A white paper intended to give econsumers confidence ignores the wider issues, says Clive Akass.

Trustworthy websites will soon be able to gain accreditation from a new 'fair trade' body, the government has pledged in a bid to boost confidence in online shopping. The promise, made in a white paper, followed hot on the heels of publication of the draft *Electronic Communications Bill,* which covers etrade.

The Government describes this bill, which will be put to Parliament in the autumn, as providing a 'light-touch framework', which will curb fraud while providing ecommerce with a minimum of restrictive legislation. In fact, the bill's emphasis is more on facilitating etrade than on protecting the buyer. A separate white paper, *Modern Markets: Confident Consumers*, describes existing consumer legislation as needing little extension. But it adds: 'The Government will legislate when new circumstances emerge... that cannot be dealt with in other ways.'

The paper promises action to allow dissatisfied buyers to gain redress quickly and cheaply. It says online buyers in particular want to be sure that their payments are secure, that what they have ordered will turn up, and that there will be some way to sort problems out.

The accreditation body, provisionally called TrustUK, will be in place by the end of the year. It will ensure that applicants adhere to a code of practice and it will provide a distinctive hallmark for sites which gain its approval.

You can design your own business cards online at www.cardcorp.co.uk. Etrade sites like this will soon be able to carry a seal of approval

The body is being set up in conjunction with the Consumers' Association – which already runs a similar scheme called Web Trader – and the Alliance for Electronic Business. Alan Stevens, editor of *Which? Online*, says: 'Shopping online offers great benefits to consumers but understandably they want reassurance that the Internet is a safe place to shop.'

The *Electronic Communications Bill* approaches security from another angle, making electronic documents and signatures legally valid. The most controversial proposal of earlier drafts, the 'key escrow' plan to enable police and security services to read encrypted files, has been dropped.

This would have required decrypt keys to be lodged with so-called Trusted Third Parties, which would be obliged to surrender them to the authorities. Instead, the bill gives police and security services the authority to demand either the key to an encrypted document or a decrypt.

Critics point out that, as drafted, the bill allows police to demand decrypt keys without obtaining a warrant. A DTI commentary casts a curious light on why the Government is so keen to gain access to the keys: 'During 1996 and 1997, "intercepts of communications" led to 1,200 arrests, and the seizure of 450 firearms and drugs worth £600m.'

But none of the draft measures appear to address what could, for the Government, be far costlier than crime – tax avoidance by Web companies based overseas. The problem has been highlighted by bookmaker Victor Chandler, which is evading a nine per cent betting levy by taking bets online from Gibraltar.

The process is ongoing and ministers are still seeking comments on both the bill and the white paper.

www.dti.gov.uk.

By George, it pays to be careful

PCW's own consumer watchdog, Anthony George, can be forgiven for casting a rather jaundiced eye on Web purchases. As manager of our customer relations department, he deals with the proportionately few off-the-*PCW*-page transactions that go wrong.

His advice, as always, is to pay by credit card, the supplier of which is liable for losses if the transaction goes wrong. But even this apparently straightforward liability can become blurred. Companies that put their own brand on Visa or Mastercard cards, for instance, may deny a contractual relationship with an offending vendor.

An out-of-court settlement was made by one such company, which initially tried that one on. But Tony said: 'The fact that this sort of thing is extremely difficult to resolve when it occurs in Britain is nothing compared with the trouble which may be encountered if payment is made for goods – which are not received, or are faulty – from a company in Milwaukee, for example.'

Hidden surprises in Tiny packages

Clive Akass weighs up the pros and cons of the latest company drive to get you on the Internet.

There is no such animal as a free PC. But this is precisely what Tiny claims to offer to people who sign up to its phone service and fee-free net-access bundle.

The phone link is provided by Cable & Wireless, which is as solid as British Telecom, and line charges are pegged to those of BT. On the face of it, BT customers get instant net access and a PC worth about £300 at no cost, simply by switching providers. So where's the catch?

The PC is basic, to say the least: a 300MHz Celeron processor (the one with the cache, not the crippled first release), a 3.2Gb hard disk, a CD drive, 32Mb of RAM, a 56K modem, a 12-month warranty, and free delivery.

This would be more than adequate for routine tasks if you were not expected to use a TV link as a monitor. The system also lacks a floppy drive, speakers, and any software except Windows 98.

And you have to spend £25 a month (plus VAT) in phone calls for a year, making a total commitment of £352.50 including VAT. Tiny reckons the average bill for voice calls is between £22 and £24 a month, and that net time will make up the difference. Even so, the figures hardly support its claim to be opening up the Web to poorer people.

For an extra £7.49 a month over four years, plus £39.95 delivery – a total of £399.47 (inc VAT) – you get a better system boasting a 333MHz Celeron, a 4.2Gb hard drive, a 15in SVGA monitor, speakers, a claimed £400 worth of software, and 12 months' free insurance.

You'd be better advised to upgrade the free one. A cursory trawl of adverts will find you a 15in monitor, a floppy drive, and speakers for around £150, including VAT.

Tiny gets from the deal much the same as high-street chain Tempo gets from its launch of Screaming.Net, which offers freephone Web access via Localtel during the evenings and weekends. Both are trying to capture customers in time for the ecommerce explosion; both are, in effect, taking a cut of your phone bill.

Screaming.Net offers a good comparison. It can't yet provide usage figures – the service's many teething problems would render them meaningless anyway – but we can take some ball-park figures from AOL. Its UK users spend an average 14 minutes a day online – about seven hours a month. When AOL abolished time-based charges in the US, where local calls are free, time spent online quadrupled.

Therefore Screaming.Net's free off-peak usage could average 56 minutes a day in the UK, if it manages to get its service levels up to scratch.

▼ TINY'S MARKETING DIRECTOR NEIL STEVENS WITH THE 'FREE' PCS – BUT THOSE MONITORS COST A LOT EXTRA

This may be on the high side in the short term, but remember that Web concerts and other lengthy attractions are more viable on freephone; and the more that people use the Web, the better the general content will become.

The figures in the table (*below*) show the annual cost for these usage figures for both deals, assuming a year (with days off) of 50 weekends and 240 weekdays, with net access exclusively off-peak. With 56 minutes a day off-peak net time, your savings on Screaming.Net, would virtually cover the cost of the Tiny PC in a year.

Tiny's deal is more like a disguised hire purchase. With the company raking in those line charges, the longer you stay with it, the worse it gets. But, used cannily, it might suit some people.

Cut-price phone services should offer you still better discounts on line charges.

You could, for instance, sign on to Cable & Wireless direct, rather than through Tiny. Everyone gets 100 free local minutes a month, a maximum 50p charge for any national call on Saturdays, and up to 20 per cent off international calls. Its site at www.cwcom.net includes a calculator that will estimate your savings.

www.uk.tiny.com

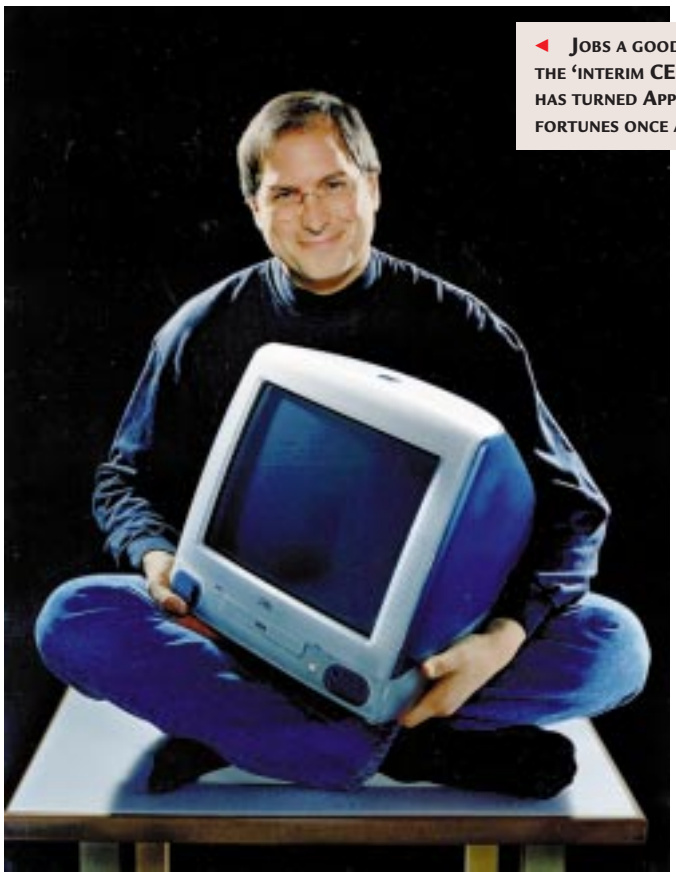
Figures for net time all off-peak. All include VAT but exclude line rental.	TINY			SCREAMING.NET		
	cost/min	14 min/day on net	56 min/day on net	cost/min	14 min/day on net	56 min/day on net
100 weekend days	1p	£14.00	£56.00	0	£0.00	£0.00
240 week days	1.49p	£50.06	£200.26	0	£0.00	£0.00
Average monthly voice bill £25.85		£310.20	£310.20	Less 10%	£279.18	£279.18
Annual total		£374.26	£566.46		£279.18	£279.18
Annual saving					£95.08	£287.28

Just the Jobs?

Tim Bajarin looks at an amazing recovery and asks if Apple can make it long term on style alone.

Steve Jobs is doing a masterful job of getting Apple back on track, which is ironic as the company's first major turnaround was a direct result of him running it almost into the ground. In 1984, right after the Mac was introduced, it became clear to Apple's board that Jobs' management style and shoot-from-the-hip approach to products was a major problem. They brought in John Sculley, who quickly brought order and discipline and helped the company become a computing powerhouse.

The company took a terrible dive after Sculley was forced to resign in 1993 and it was on its deathbed by the time Steve Jobs took the reins again in 1998. Today, at least on the surface, Apple looks mighty good. When Jobs took over, Apple's stock was about $13. It recently closed at $54.



◄ JOBS A GOOD 'UN: THE 'INTERIM CEO' HAS TURNED APPLE'S FORTUNES ONCE AGAIN

When Jobs started his role as interim CEO, as he calls himself, the morale inside Apple was very bad. More than 20 top managers quit, leaving very few talented people to help turn the firm around. However, he brought in two top executives, Jon Rubenstein and Avi Tevanian, both former NeXT employees, and as they say, the rest is history.

In two years, Jobs has brought the lustre back to Apple, introduced powerful computers that meet and exceed the demands of its high-end customers, and is now taking aim at the emerging consumer market. His iMac is a real hit, with its unique design and multi-colour formats and he has increased market share from four per cent in early 1998 to about 5.8 per cent today. The iBook, Apple's new consumer portable, should bring in first-time users as well as meeting the Mac community's demand for a low-cost portable.

So – in the short term, at least – it looks like Apple is back on track towards a rosy future, but there are still worries about the long-term. The reason for this concern lies in the fact that everything Jobs and his team are doing today is based on industrial design, something that is often faddish, and even worse, it can be replicated by others.

Apple should be applauded for pushing the design envelope and showing the rest of the PC market that it is OK to create products that look cool and are fun to use. But soon, Compaq, Dell and IBM are going to realise that their square, black and beige boxes are not going to appeal to consumers and will have to follow Apple's lead if they want any part of this emerging market.

When Steve Jobs introduces a system that helps set Apple apart from its PC brethren, he buys Apple another 18 months of profitability. But, if he wants to keep those consumer profits up, he is going to have to keep new and unique machines coming. That puts an amazing amount of pressure on Apple's industrial design group.

Proprietary software, such as the new Sherlock 2 in the soon-to-be-released OS 9, can help Apple provide some differentiation, but software can only go so far. The PC market will eventually provide similar hardware and software designs, taking much of the wind out of Apple's marketing sails. Apple users are very loyal, but they will eventually ask the critical question: 'What will you do for me next?'

Apple sources say that the next big priority is to develop a PDA. At the recent MacWorld in New York, the booth that drew the largest crowds besides Apple's own was the one showing the PalmPilot, which now boasts a program that synchronises with the Mac. But Mac users want their own PDA.

Steve Jobs killed Apple's Newton handheld shortly after rejoining the company. He did not say that he was against PDAs, only that he did not like the Newton's design and platform. So, expect Apple to turn its design eye towards creating a 'pocket Mac' that will probably use the PalmPilot OS.

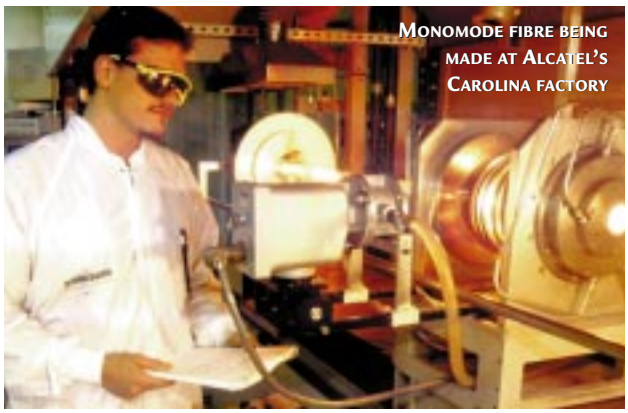
Other predictions are that Apple will bring out high-end G3 desktops in at least three colours by January. Today, they come in only teal. The company is also tipped to bring out an iMac with a more powerful processor and a 17-inch display by next January's MacWorld.

Apple has to keep PCs at least a year behind when it comes to creating unique and stylish products. The danger is that the PC world will shake off its stodgy ways and start creating products that are just as cool.

Dave Mitchell reports on the rise and rise of the Gigabit

Thanks a billion

Ethernet tends to get taken for granted at a time when all the talk is of Windows 9x, NT, Linux, UNIX, NetWare (well, sometimes) and the global march of TCP/IP. It sits under them all, allowing them to span the networks of offices and corporate campuses across the world. Boosts in speed to 1Gbit/sec and beyond could turn office work into a multimedia experience.



MONOMODE FIBRE BEING MADE AT ALCATEL'S CAROLINA FACTORY

Ethernet is a remarkable thing. Since it was first mooted in 1973 by Robert Metcalfe, it has become the dominant networking technology, with an estimated 100 million interfaces installed worldwide. And during that time the original specification has remained essentially intact.

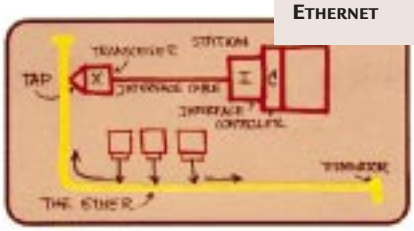
One of its fastest growing areas is in the home and small office, but at the corporate level Ethernet has evolved to meet the demands for ever increasing bandwidth. With a few simple tweaks, Fast Ethernet provided a ten-fold increase in speed over standard Ethernet and now Gigabit Ethernet offers huge pipelines, capable of handling one billion bits per second.

With 10/100/1000 Mbit/sec speeds on the menu, Ethernet has the capacity to serve as an end-to-end solution for the majority of networks. Gigabit Ethernet is used mostly at the backbone, where switch-to-switch connections over optical fibre are used to link buildings and departments.

Gigabit network interface cards (NICs) are also used to link machines within server farms, and connect them to the network. 3Com and Intel, among others, produce PCI-based Gigabit Ethernet NICs that support all major network operating systems. Gigabit Ethernet switches are currently too expensive to warrant moving them closer to the desktop, so most users still connect at 10Mbps. However, prices will eventually drop, allowing Gigabit Ethernet to take over most switching functions on the network, with100Mbps links extending to the desktop.

The Institute of Electrical and Electronics Engineers (IEEE) 802.3z standard – approved last year – specifies 1000Mbps connections over single-mode and multi-mode fibre channels. The former, which uses one mode of light as a carrier, can support high data rates over long distances; while the latter carries multiple modes of light simultaneously, each at a different reflection angle within the core. Multi-mode is less costly but can only be used for short distances because of light dispersion.

Currently, the multi-mode 1000BaseSX standard only supports distances up to 550m, while the single-mode 1000BaseLX can run to 5km. These limitations are already being overcome, with 3Com expecting to support 1000BaseLX links of up 70km by the end of this year.



METCALFE'S ORIGINAL SKETCH OUTLINING ETHERNET

The 1000BaseT standard, ratified only in July, supports Gigabit Ethernet over copper cabling – Category 5 Unshielded Twisted Pair (UTP). This is important, because structured cabling installed in company offices is difficult and expensive to replace. The IEEE says any copper cabling that currently supports Fast Ethernet should support Gigabit Ethernet.

However, Category 5 cabling installed before 1995 may contain non-standard hardware, the connectors being a particularly weak point. Even dirty punch-down blocks may cause a problem, so it is advisable to test the cabling before upgrading.

The fact that Gigabit is an extension of an established specification is its biggest advantage – it uses the same collision-detection protocol, frames size and formats as Ethernet and Fast Ethernet [*see box, left*].

There are already plenty of tried and tested Gigabit Ethernet products on the market and all the major players are involved, through the simple expediency of buying one of the numerous start-up companies. Clearly, networking technologies are increasing at a far greater rate than Moore's Law predicted – with a further ten-fold increase in performance over Fast Ethernet and all in less than two years.

Working to avoid a nasty collision

Some modifications were required for the collision-detection protocol (which allows two machines to use the network at the same time) to function in Gigabit Ethernet, without further reducing the maximum network diameter – the greatest distance between two connected nodes.

Fast Ethernet dropped the maximum diameter down to 200m, so Gigabit Ethernet would require a reduction to only 20m otherwise a transmission would reach its destination before a collision could be detected. Clearly, this was unacceptable, so for half-duplex operations the minimum Gigabit Ethernet frame size was increased to 512 bytes. By inserting a carrier extension field into smaller frames, the minimum transmission times are the same as a 64 byte frame over Fast Ethernet, so the 200m limitation can be retained.

Collision detection is switched off for full duplex operations, as separate cables are used to transmit and receive, so there are no such limitations.

network... with 10-Gigabit on the horizon.

Riding the 10-Gbit wave division

If you don't think Gigabit Ethernet is fast enough then how about a further ten-fold increase in speed? Work is already underway on a new specification called, unsurprisingly, 10-Gigabit Ethernet. The IEEE 802.3 HSSG (High Speed Study Group) is looking at ways of shovelling 10 billion bits/sec down fibre-optic cables.

One proposed method of handling this huge amount of bandwidth is wavelength division multiplexing (WDM), which allows different sources of data to be placed together into a lightstream on an optical fibre.

Hewlett-Packard is already utilising the technology for its SpectraLAN project. Instead of creating a single 10Gbps channel, however, it uses WDM to produce four independent channels over standard multi-mode fibre.

SpectraLAN modules use the latest VCSELs (vertical-cavity surface emitting lasers) with wavelengths of 820 nanometres (nm), 835nm, 850nm and 865nm to create four parallel 622Mbps channels, which are multiplexed together and inserted into the fibre cable using a special mirror. Once VCSELs have been reduced, they can be coupled to the input face of the fibre to emit light directly into the core.

At the receiving end, the signals are de-multiplexed and sent to four different detectors. So far, HP has demonstrated error-free operation of SpectraLAN at speeds of 2.5Gbps and 4Gbps, over distances of 500m and 300m respectively.

SpectraLAN is one of a number of proposals put forward for 10-Gigabit Ethernet, but don't expect any products yet. Standards for both Fast and Gigabit Ethernet took around 30 months to go from initial study to final approval, so 10-Gigabit Ethernet is unlikely to be ratified until 2001,with widespread adoption in 2002.

Ethernet goes up and ATM

Gigabit Ethernet was barely off the drawing board before it was hailed as the death of ATM (asynchronous transfer mode). Primarily designed for international traffic, ATM was brought to the networking environment as an end-to-end solution for LANs and WANs and for its ability to handle multimedia.

ATM's early adoption was held back severely by high component costs, a lack of compatibility between products from different vendors and slow ratification of standards. It also suffered from a poor perception as it was, and still is, fundamentally different to Ethernet.

ATM uses small, fixed-length cells consisting of a five-byte header and a 48-byte data payload. The header contains information about the path the payload is to take over the network.

Unlike Ethernet, ATM is connection-based, so a link between sending and receiving stations must be created before any data is transmitted. This is achieved by creating a Virtual Channel Connection (VCC) between the two end systems. The VCC itself will be one of many contained within a Virtual Path (VP). So, for example, a physical connection between two ATM switches would contain a number of virtual paths and within each one there would be many virtual circuits. Furthermore, there are two types of virtual circuit. Switched Virtual Circuits (SVCs) are set up dynamically and broken after usage has ceased, while Permanent Virtual Circuits (PVCs) are physically created at the switches by administrators.

Using ATM, Quality of Service (QoS) can be guaranteed. During connection set-up, the network is informed of the type of traffic and the QoS required and a connection will only be created if the bandwidth can be guaranteed.

▲The Forerunner ASX-4000 ATM switch from Fore boasts a capacity of 40Gbit/sec

Whether Gigabit Ethernet becomes a nail in ATM's coffin remains to be seen. Standards-based Gigabit switches have been available for nearly a year now, prices are significantly lower than ATM products and, where QoS was seen as an answer to congested networks, many firms are preferring to use Gigabit Ethernet's extra bandwidth.

Switching to high speeds

One of the cheapest methods of boosting the performance of an existing network is to implement switched Ethernet. This reduces the amount of traffic being propagated across the entire network by creating virtual connections between sending and receiving stations, and routing data only to its destination. Ethernet switches look very similar to standard hubs, or repeaters, but have built-in intelligence.

◀HP's ProCurve 8000 switch will be fitted with a 100BaseT module

The first time a transmission occurs between two network devices, the switch memorises and stores their addresses in a forwarding table. Whenever a frame of data is received, the switch checks the destination address and sends the data only to the port that the recipient is attached to – effectively creating a virtual connection between stations.

Ethernet switching is a relatively cheap means of improving network performance and dual-speed switches that work at both 10 and 100Mbps are now in the sub-£2,000 price range. Many of these products also have expansion slots for Gigabit Ethernet modules. Hewlett-Packard has already announced a 1000BaseT module for its ProCurve 4000 and 8000 switches for Gigabit connections over copper cabling.

Style over content

Gordon Laing is underwhelmed by the iBook, despite its show-stealing performance at MacWorld.

Despite constant 'would it' or 'wouldn't it' rumours, Apple finally went public with its fabled consumer iBook this summer. Anyone who missed interim CEO Steve Jobs' keynote speech was left in no doubt as to the star of the show – posters of the iBook adorned every entrance of the Jacob K Javits Convention Centre, while stadium-sized banners hung within. And why not? The iBook could be to notebooks what the iMac was to desktop PCs: attractively designed, consumer-friendly and, most crucially of all, cheap.

Well, relatively so: $1,599 gets a fairly hefty but well-built notebook measuring 344x294x46mm, weighing 3kg and claiming to offer an impressive six-hour battery life. The 800x600 pixel 12.1in TFT display and the keyboard seem dwarfed by the wide clamshell case which surrounds them; at least there's plenty of room for resting wrists. The carrying handle is an unexpected but welcome touch.

In raw specs, the iBook supplies a 300MHz G3 processor, 3.2Gb disk and 32Mb RAM. The graphics are driven by a 4Mb ATi RAGE mobility 2xAGP chipset. Connectivity-wise, the iBook features 10/100 Ethernet, 56K modem and a single USB port; there's also a built-in 24x CD-ROM drive, but no floppy.

There are crucial differences between the iBook and its more powerful G3 PowerBook counterparts. The latter boast faster processors, bigger screens and greater customisability, with a PC Card slot and swappable drives.

Where the iBook really scores is with its unique wireless connectivity. Apple has snaked an RF antenna around the inside top of the case, which communicates with hardware access points up to 150ft away at 11Mbit/sec, using the wireless Ethernet 802.11 standard. Each $400 access point in turn connects to a phone point or network and can support up to 10 iBooks – but there were no announcements of a PC Card version for the PowerBooks. Apple calls its wireless technology AirPort – the same name that Adaptec uses for its ill-fated infra-red desktop adaptors.

The iMac has certainly changed Apple's fortunes, but it's far from certain that the iBook will enjoy a similar success. It's cheap, but not cheap enough to be a no-brainer purchase, and the question remains whether consumers really want a notebook. Those that do can choose from blueberry or tangerine but must wait until September, a date which could well be too late for this year's school buyers.

If this piece seems dominated by the iBook, it's a fair reflection of the entire show. There really was little else on the new product front. So saying, all the usual suspects were showing their most recent products, such as Adobe with its Web-savvy Photoshop 5.5, but strangely, there was no sign of QuarkXPress. All in all, the show was dominated by Web and video editing tools, with traditional print tools hardly getting a look in.

Highlights

Following Epson's lead in transparent coloured cases for its photo-inkjets, Tektronix showed a very attractive blue version of its Phaser 840 solid-ink colour printer. Dubbed the Designer Edition, it was essentially a fully loaded version of a plain 840, with ColourSync technology, 1200dpi resolution, 128Mb RAM, SCSI and 10/100 ethernet.

Also in transparent blue was the McPiper cordless DECT phone (using a 900MHz frequency we use for GSM cellphones in the UK). The base connects to the iMac's USB port, and allows the handset to access the host's address book. It will even use the iMac to make voice notes or read out messages to you.

SGI showed its wide aspect 1600x1024 pixel TFT monitor, sold to Mac users for $2,495 with a specially designed Number9 graphics card. Traditionally, TFTs suffer from a lack of detail in the shadow and highlight areas, which is a problem for photo or video editors. However, SGI solves this using custom gamma-correction software; although sadly this is not yet available for the Mac bundle.

Microsoft announced Internet Explorer 5 and OutLook Express 5 for the Macintosh, but only demonstrated the latter. Both are expected this autumn and – like the current 4.5 versions – will feature Mac-specific options missing on the Windows product. The next Mac Office is expected mid-2000 and may be called Office 2001.

Speaking of Windows, Connectix demonstrated its VirtualPC 3.0 software emulator, with support for IP sharing, USB (but not FireWire), better SB16 audio, and AppleScript support. The company is selling DOS, Windows 95 and Windows 98 versions.

In a similar fashion to the iMac driving USB peripheral development, the G3 desktops are doing the same for FireWire. Hard disks and DV Camcorders using FireWire interfaces are old hat – at the show QPS previewed a $599 FireWire DVD-RAM drive, while Mactell showed FireWire CD/RW, DAT, 3.5in MO, and a $449 Magneto-resistive MR drive which swallowed $22 2.2Gb cartridges.

So a few scraps, but all in all there was only one truly new product: Apple's iBook (albeit with no competition) easily stole the show.

☛ *Can style alone see Apple through? See Tim Bajarin, on page 52.*

GORDON LAING

www.apple.com
www.mcpiper.com
www.sgi.com/go/flatpanel
www.designeredition.tektronix.com

Shhh... can you keep a secret? Gordon Laing tells you how to beat Intel at its own game.

The truth is out there

Without sounding too *X-Files*, I reckon there's some strange stuff going on in the world of processors. I'm talking about Intel's Celeron, a CPU full of surprises, and one that has again accidentally given a convincing argument to be your chip of choice in almost any configuration.

But Celerons are cheap and nasty, right? Surely a reassuringly expensive PIII is the way forward for top performance? Well, the PIII (and PII) features four times the Level 2 cache – 512Kb vs 128Kb – but the Celeron's is on-die, which means it runs at the chip's core speed – double that of the L2 cache in the PII and PIII.

Current PIIIs boast a front side bus (FSB) of 100MHz compared to the Celeron's 66MHz, and uniquely boast the additional Internet Streaming Extensions, but does any of it make any difference?

Take the SysMark benchmarks used in *PCW*, which run an extremely broad range of applications (although none yet supporting the PIII extensions). In June, *PCW* grouptested a load of PIII 500s, which scored on average 195. In September, the first Celeron 500 hit the VNU Labs, scoring 185. Not a massive difference is it?

According to many hardware sites, a Socket 370 366MHz Celeron will happily run at an FSB of 100MHz, RESULTING IN A 550MHz CPU

The Celeron effect is even closer with mobile notebook processors. Both Intel's mobile Celeron and PII processors run at 66MHz externally and are available with identical clock speeds. The only difference is again with the L2 cache, this time both on-die, but only 128Kb vs 256Kb for the mobile Celeron and PII respectively.

PCW group tested six Celeron notebooks, and one running at 366MHz scored 132, the same as a mobile 366MHz PII reviewed a couple of months back. Yet there is a threefold difference in the cost of the CPU!

The PII and PIII range has one other 'superior' differentiating quality from the Celerons, and that is support for Symmetric Multi-Processing (SMP). This allows you to pop typically two or four identical CPUs onto one motherboard and have them work together. Your OS will have to be SMP aware, which means BeOS, Linux, Windows NT or Windows 2000. SMP-savvy apps include Adobe Photoshop and even Quake Arena (build 1.06 onwards); ID's John Carmack has suggested that SMP will boost Quake Arena's average performance by 20-30 per cent and by as much as 80 per cent in busy fight scenes.

But you'll need an expensive dual PII or PIII system, right? Well, wrong actually. SMP support may have been disabled in the Celeron, but anyone brave enough with soldering irons and tiny drill bits can re-enable the feature. Tomohiro Kawada of Kikumaru Technical Laboratory is the Web's recognised expert on such matters, and his site shows exactly what's involved.

Owners of Socket 370 Celerons can fit them to cheap Slot 1 (Slocket) adaptors and make the modifications to these instead. Then again, why not check out Abit's BP-6 dual Socket 370 motherboard, which seems to happily support SMP with two S370 Celerons?

The latest craze is to overclock SMP Celerons. Intel may have locked the clock multiplier on its recent chips, but you can easily increase the external FSB settings. The Socket 370 366MHz Celeron uses a 5.5 times multiplier on its recommended 66MHz FSB. According to many hardware sites, it will happily run at an FSB of 100MHz, resulting in a 550MHz CPU. And remember, this is one with an L2 cache now running at 550MHz (a 550MHz PIII only runs its L2 cache at 225MHz).

At the time of writing, one supplier was selling its remaining 366MHz Socket 370 Celerons for £47 each and the Abit BP-6 board for £80; a single PIII 550 would cost you £439. According to a number of sites (see www.firingsquad.com), a pair of overclocked 366 Celerons outperform a pair of PIII 500s running Quake Arena, at a fraction of the cost.

Windows 2000 will give the mass-market OS support for SMP, and it's encouraging to see games like Quake Arena make use of dual processors. It's even better to see that with a little effort, you can persuade a pair of cheap Celerons to work together. Overclocking has traditionally been the realm of the true hardcore experts, but there's nothing difficult about increasing the motherboard's FSB from 66MHz to 100MHz – just watch that pair of 366 Celerons ramp up to 550MHz each, and you won't even need to buy exotic 133MHz memory. For these reasons I invite you to join me in a toast to the humble Celeron – I never thought I'd be able to afford more than 1GHz of dual-processing power.

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The DTI is pushing ebusiness, but Barry Fox finds everyone passes the buck when problems arise.

Ecommercial breakdown

The British Government's DTI wants to 'build trust in electronic business and make the UK the most ecommerce-friendly nation'. Nice idea, pity about the reality.

After I reported that CompuServe subscribers are at risk from scam messages – which look official and ask for their password, credit card and banking details – many readers told similar tales. CompuServe has never been willing or able to explain why it is powerless to trap the scammers or block the messages. And it is still going on.

A user in Germany recently received a message which threatened to shut down his account unless he replied with his banking details. 'We are sorry for the inconvenience and hope that you will continue to enjoy CompuServe,' it reads, ending with the note: 'Copyright CompuServe Interactive Services Inc.'

So I bundled up a pile of evidence and sent it to David Edmunds, director general of the telecomms watchdog Oftel. He referred it to his Policy and Analysis Office, which declared it had 'no regulatory powers' and passed it to the DTI's Corporate and Consumer Affairs Office, because it is 'responsible for implementing the European Union Distant Selling Directive'.

Demon caters for specialist users who are serious about the Internet, whereas Freeserve is a BAG OF SWEETS given away in Dixons stores

I heard zilch from the DTI, and after two ignored reminders raised the issue with Kim Howells, the minister in charge. This finally produced a response – six months after I raised it with Oftel. 'It's nothing to do with us,' said the DTI. 'You should try the Home Office. We can't forward the papers forwarded from Oftel because we can't find any trace of them.'

Thanks to Freeserve, it's probably academic anyway, because time is fast running out for CompuServe and its owner AOL. They still charge silly prices and are struggling to find a way to offer free access to some users, while still charging others.

Dixons has just floated Freeserve and made a killing. In less than a year, more than one million people have signed on. When asked, I recommend it, but only if it comes pre-loaded or the PC has not previously been set up to use another service. Freeserve can trample existing settings and phoning the Help Line then costs 50p a minute (and it used to be £1).

Some users are finding that there is an unexpected price to pay for the free service. This is caused by the system Freeserve uses to allocate the 'unlimited email addresses' promised in its adverts. I found out for myself when I belatedly accessed my Freeserve email box and found over 650 messages waiting, some of them megabytes long. I gave up downloading when I realised that none were meant for me.

The usual way to allocate email addresses is to put the user's name ahead of the @ sign, with the host name following. So if I signed up to AOL, I'd be Fox@AOL, or something like Fox16 if others had got in earlier.

Freeserve puts the user's name after the @ sign, so my identifying address would be @Fox.freeserve.co.uk. I could then create any number of mailboxes, such as Mum@Fox, Dad@Fox and so on. But if I don't set up mailboxes, any messages sent to Barry@Fox, Fred@Fox, etc will all be delivered to me.

This is the price that you pay for privacy. Freeserve does not publish any list of addresses, so there is no way of knowing whether I am Barry@Fox, Anyname@Fox or Anyname@Fox16, unless I tell you. (All these addresses are fictitious, by the way).

'People are trying to guess other people's addresses and getting them wrong,' says a spokeswoman for Freeserve. Early adopters with simple addresses – such as @Smith rather than @Smith55 – are most at risk of receiving other people's email.

Freeserve's addressing system was modelled on Demon Internet's, one of the earliest ISPs. After seven years, Demon has 250,000 paying subscribers but doesn't experience problems with incorrect delivery.

The difference is that Demon caters for specialist users who are serious about the Internet and can grasp the mind-bending address system, whereas Freeserve is a bag of sweets given away in Dixons stores. The problem will only get worse as the user base expands. Dixons says it is now 'looking' at what can be done. But it's hard to see how the system can be changed, without driving customers off to the rival free services that are popping up like mushrooms. And that's when the bubble bursts.

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Brian Clegg wonders if business is embracing the Web for entirely the wrong reasons.

Lest we forget...

There's only one certainty when using computers in business – things will turn out differently from the predictions. This has been the case ever since the study commissioned 50 years ago by Thomas Watson Snr of IBM decided that the world would only ever need a handful of those new-fangled electronic machines. Bill Gates showed it was still true in 1995 by getting it oh, so wrong about the Internet.

This unpredictability also applies to the benefits of using computers. In the early days, they were seen as a way of saving money on people. Instead, the outcome was often to perform the more complex tasks at a quicker rate. After the computers came in, the wage bills would often be just as high (if differently distributed), but the ability to process things such as banking transactions or airline tickets was much faster and across a global network.

There was a rather different misguided expectation with personal computers. Many business PCs were bought with the idea that they would enable office workers to get things done faster. While it's true that, for example, spreadsheets speeded up routine calculations, the benefits have often been more in quality than in speed. In case anyone doubts the quality claim, I keep within easy reach a report I produced for a large company in 1980. Typewritten, with only the occasional error, it is accompanied by hand-drawn graphs. It's amazing how quickly we forget how awful typewritten documents looked.

The opportunity is there to give great customer service but the HORROR STORIES that abound show that many companies haven't yet realised its importance

But I digress. It's often the case that bad predictions are a result of distraction. These exciting, shiny toys distract us from the fact that computer systems are actually computer/human systems. It's the people that make things go wrong. Or rather, it's the way system designers don't give enough consideration to people.

Right now, companies are eagerly jumping into using computers and telecommunications for customer handling like hyperactive lemmings. It's impossible to watch the news these days without hearing about another call centre being set up, or another bank deciding to provide all of its services via the Web. I am inundated with press releases about ecommerce products and systems that will control your customer base over the Net. But there's a problem. The assumption these companies are making is that this is a way to save money. And if that is all they focus on, they are going to be in trouble.

The appeal of a product or service is generally based on price, content, customer service, convenience and brand loyalty. It's often difficult to distinguish between the products provided by call centres and across the Net on price or content or convenience. Brands remain important, but the marketplace is less clear – who would have thought a few years ago that we could open a savings account with the Standard Life Bank or even Tesco?

What remains is customer service. The opportunity is there to give great service, but the horror stories that abound about spending half an hour ploughing through a voice menu, and about emails that are never answered, show that many companies haven't yet realised its importance. Such is the concentration on the technology and cost saving that precious little thought is being given to levels of service for these invisible customers – customers who can't be won over with a smile. It's about time businesses with remote customers spent far less time on technology and a lot more on people.

Finally, I have to admit to joining the enemy. I've had lots of correspondence from readers who shared my poor modem performance when their second line was provided using a DACS box. Like them, I fought the BT suggestion that the obvious solution was to move to Highway (ISDN). I was one of the lucky ones who got a second physical line, experiencing a near twofold increase in connection speed despite BT's protestations that DACS doesn't make any difference.

Now, though, I've converted to Highway. The reason being that in my business I use email and the Web a lot; and the cost balance has finally swung across. The deciding factor was the recent thunderstorms that trashed my modem. Since I had to replace the equipment anyway, the expense didn't seem quite so extreme – and anyway, who am I to argue with an act of God?

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Paul Smith decides that if ADSL won't come to Mohammed, it's time to move to a better area.

Moving experience

We're finally moving. After about 12 months of house-hunting, gazumping and then last-minute haggling over price, we are finally ready to move. This Friday, in fact. For Del, it represents the culmination of a long-held desire to improve our familial lot and escape the confines of a tiny flat, made, admittedly, somewhat tinier by the huge volume of PCs, monitors, printers, joysticks, speakers, software and peripherals necessary for any decent Half-Life setup.

For me, however – and I'd thank you to keep this to yourself – it represents something far more fundamental: we're moving to an Asymmetric Digital Subscriber Line (ADSL).

When BT's current West London ADSL trial was originally mooted, I was the first in line. With only the dear readers' interests at heart, I sought, and was promised, inclusion on this trial on the basis that I lived in West London, in W14. I was patient and waited while the trial was delayed. I checked that it would still be going ahead and received assurances.

Given the features of ADSL, bandwidth should become ONE OF THE LESSER PROBLEMS of Internet access. Well, we'll see

Then the day came and, lo – I was two blocks outside the trial zone. I was gutted. I went to find out what the zone was and have, since that dark March day, subtly ('But look at the parking and the schools! And look at all the butterflies and how sunny it is!') pushed for a new property in W12. Bizarrely, my scheming worked. She fell for it, and on Friday, we'll be in the zone.

This is good because it transpires that BT's trial isn't quite as over as we'd hoped. The unofficial roll-out of consumer ADSL seems to be slipping. First, it was scheduled for the end of summer. Then October, November, and now it looks like early spring before most ISPs will offer it.

At the same time, the pricing waters have become muddied. The trial is being conducted at a flat £30-a-month fee. This was fantastic news, as it meant the end of time-metered calls, which are the bane of every Internet user. It even sidesteps data-metering, where you are charged by how much data you transmit, ostensibly a pretty reasonable way of charging for network use.

So a flat fee is particularly chirpy news. Given the features of ADSL (quick primer – those in the know may skip to end bracket – means that ADSL transfers information at 2Mb downstream and 256Kb back again and it's always on), bandwidth should become one of the lesser problems of Internet access. Well, we'll see.

Now it turns out that the £30 price tag that was originally quoted is actually somewhere between £40 and £150. And that's a wholesale price to the ISPs, not to the consumer. BT apparently forgot that there are other ISPs besides BT Interactive and Oftel had to remind them. Whether that reminder was couched in the language of local-loop unbundling has not been confirmed by either side. However, it may explain the added delay in rolling out the service, giving the ISPs an extra 90 days to prepare.

By the way, that 256Kb upstream speed may seem fast, but actually it won't help me with my main upstream problem. It's the one thing they don't tell you about websites, when they go on about global narrowcasting and drag-and-drop, wizard-driven HTML development. And that is: websites are a lot of work. They need constant attention, like an infant, and the curious or merely bored who have visited my site will know that attention is not what the site has been getting.

Actually, I don't know whether it is like raising an infant as that pleasure is still four weeks away. Those with a calendar to hand will note the close connection of our moving house and our having a baby. Clearly this is a plot by someone to avoid having to help move heavy items of furniture but, be assured, dear reader, that your vigilant columnist will not fall for such excuses. Everyone shall pull their weight.

Everyone except Edward, that is. Edward's constant search for new, hot places to sleep has been made easier recently with the hot weather. Now that it's raining, he has found the perfect feline spot, on top of a bank of router, hubs and switches that, laughably, I use to connect my one running PC to the ISDN line. I wonder if ADSL will prove as warm and comforting.

www.paulsmith.com

letters

Send your letters to >
The Editor
Personal Computer World
VNU House
32-34 Broadwick Street
London W1A 2HG
or email > letters@pcw.co.uk
or fax > 0171 316 9313

LETTER OF THE MONTH

Linux and the FAT farm

Reading PCW over the last few months, I have taken issue with some of your reporting on Linux. I am the first to admit that the OS is not yet perfect and has a long way to go before it comes anywhere near Microsoft in terms of ease of use for the first-time user and product support, but I have a few points. First, a few months ago, we were told in one of the Hands On columns that Linux could not support FAT16, FAT32, NTFS or HPFS. This is quite wrong. FAT16 and FAT32 have been supported in the kernel for about a year and a half, and HPFS and NTFS are now supported. NTFS is only read-only at the moment, although it is work in progress.

Second, your review of RedHat 6.0 may have been factually correct, but I was concerned that you thought £86 was expensive for an OS that includes all you probably need to do anything you want with a computer, except games. This is compared to the full price of Microsoft 98 SE of £160.98, which is just an operating system and is frequently prone to crashing, yet in your review of it there is no mention of the fact that it is rather expensive. Admittedly, the upgrade is cheaper for Windows, but then for Linux it is only £2 from the Linux Emporium (www.polo.demon.co.uk/emporium.html, not www.redhat.com as you said in your review)

Lastly, in the September 1999 issue, we were told: 'Macmillan has just published a Linux version of Quake and Quake 2.' Quake and Quake 2 have been around ever since the games were first released by Id Software. Id ported the games to Linux because the servers ran better under Linux rather than Windows, and lots of people want to play under Linux. In fact, the Quake 3 test was released on the Mac and Linux before Windows. In addition, many other games manufacturers are porting games to Linux.

Having said that, I would take this opportunity to congratulate the magazine, and Chris Bidmead in particular, for the improving coverage of Unix and Linux.

CRISPIN FLOWERDAY
SOUTH CROYDON

SPEED DEMONS

While engaged in a conversation in my local watering hole (where I have made several good friends solely from helping fix problems on their computers) I was amazed to hear that two lads had just purchased the latest Pentium III systems for more than £1,800 each. I say amazed because having recently worked on their old ones (a reformat and clean install of Win98 and a reboot re-install of Win95) I know exactly what was on their computers. Each system was a Pentium II 233/266, with a 3.2Gb drive with between 1.6 and 2.0Gb free. The computers were only running software such as Internet, games, Encarta 99, Windows 95/98, so they were, in fact, at a resource level of 83% free.

When I asked why they needed such high power to run stuff you could run easily on less powered machines than they already had, the amazing answer was if we all did not need higher powered machines, then manufacturers would not make them.

The truth is, I think that if we did a survey on how many people had an upgrade at great cost to, say, the latest Pentium III, and did not really need one, the sales figures would show an amazing drop and manufacturers would not be so quick to bring out new technology at such an alarming rate.

The hype given to us by the manufacturers is properly understood by very few. What difference is a Pentium III going to make to Mr Average running a Pentium II? My pals have no idea what they have bought and, as far as a DVD is concerned, have no wish to use it and did not even know you can alter it to UK/US films

But that is exactly what the manufacturers want – new hype, new mugs parting with their money who just need to boast they have a Pentium III.

Dixons, I hear, is selling £200 PCs just for people who want Internet and basic computer use. Quite frankly, my two pals would have been better off by £,1600 if they had purchased one of those.

Here's to fools and technology.

MR J SHINGLER
Jjshin666@ic24.net

WHAT A MONSTER OF A SPECIAL EFFECT

Courtesy of Universal studios

Michael Hewitt's column about CGI special effects in horror films in the September issue was spot on. I am a big fan of the old Toho *Godzilla* films from the 50s, 60s and 70s, and although I did enjoy the 1998 version, it can't compare. The old films were not really horror films, they were more fantasy, and who can honestly say they don't find two men in rubber suits wrestling funny?

The 1998 film was trying to be a horror film and Michael Hewitt's comments about in-your-face effects over suspense were bang on. CGI should be used only in sci-fi films where it is needed, and sparingly at that.

NEIL THOMAS
neil.thomas@virgin.net

Mike Hewitt got it seriously wrong in his Sounding Off column in the September Issue of *PCW*. At his age, did he really expect to be a little bit frightened by the film *The Mummy*? Would the likes of Boris Karloff and Vincent Price still seem as bottom-clenchingly good today? Personally, I think not. Did Hewitt borrow a child to watch the film? My daughter, who is 12, spent 30 per cent of her time hiding behind her popcorn. She knew it wasn't real, she guessed it was computer effects, but for her and many others of her generation it happened.

Mike, you should be thankful that you found it at least 'very clever'. Me, I went with my family to be entertained, not fooled. My daughter had a great time and maybe, just maybe that was good enough me.

D RUSSELL
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FREE AND USELESS

I seem to be getting more than my fair share of 'unable to establish a connection' messages from Freeserve so as a new shareholder, can I look upon these missed hits as a useful source of future dividend income?

My modem happily calls up Freeserve, which promptly replies with a happy whistle. A tuneful dialog then commences, which checks IDs and passwords. Great! But very frequently, Freeserve responds with an 'unable to estb...' message and disconnects, whistling a happy 'next please' as the door is slammed in my poor modem's face.

Uncharitable thoughts are passing through what Bill has left of my addled brain. Does Freeserve get a cut from BT for these contacts? Is it a handy way for Freeserve to raise funds and impress prospective investing punters? As a bit-part owner of Freeserve, should I encourage increased use of this money-spinner and quietly slide off to some other ISP which has not yet cottoned on to this scam? Have they all cottoned on?

Or have I got this all wrong?

DG KINGSTON
David@kingston6.freeserve.co.uk

Clive Akass replies > *We've had similar complaints about other service providers. They do indeed make money on your extra calls. Looks likes the problem will be with us until we all get always-on services like cable or ADSL.*

RUNNING ON MD

'Feeling all MD inside' by Paul Smith (August 1999) was interesting, but it did contain several misleading statements.

Smith states that MP3 can 'squeeze CD tracks into about a tenth of their former selves without any loss of quality'. To anyone with any reasonable sense of hearing, this is obviously false. MP3 is a lossy compression technique and MP3 files, compressed at 128Kbits/sec to give 11:1 compression, do exhibit some distortion and loss of quality. For a simple test, try listening to a piano piece both before and after compression.

Later on, Smith again says: 'Indeed, you can record digitally end-to-end if you have a digital optical output on your sound card, so you can make perfect copies of either your CDs or your MP3s.' The MD recorder does not record uncompressed data but compresses about 5:1, using, once again, a lossy compression technique. Whenever a lossy compression method is used, some loss of quality *will* occur and a prefect copy is impossible to make. Smith's article misleads readers into believing that the quality of MP3 or MD files is higher than it actually is.

RON DWIGHT
ron@knowledgebase.fi

Brian Clegg replies > *You are quite right that both MD and MP3 use lossy compression. You are wrong, however, in thinking that this implies loss of perceptible quality. Actually, there is a huge amount of redundant information – sound that our imperfect ears would never hear or miss – that can be removed; it is this data that these compression algorithms are seeking to remove.*

I take your point that copies won't be perfect in the literal sense but, in terms of portable MD and MP3 players and the typical music played on them, the copies are perfect enough. An audiophile with expensive equipment, listening to classical recordings, may spot the difference. The rest of us won't notice.

...letters

WHY UNIX HAS BECOME EXTRA-SENSITIVE

I couldn't agree more with Brian Clegg's comments (*PCW*, September 1999) on the importance of usability of software, and that usability should be the prime concern and driving force of software design.

Conversely, while I just get bored by arguments over which operating system is 'best', I do think Clegg is attacking Unix on the wrong grounds over its lack of 'case-blindness'. As a mature operating system, it had a lot to achieve within the 768Kb of a PDP-11/70 (a minimal system could run in 96Kb). Early Unix kernels consisted of around 10,000 lines of C code plus 1,000 lines of assembly – it couldn't afford the luxury of converting case before comparing character strings. In fact, Richie and Thompson, writing in 1978, were quite proud of the fact that Unix was developed in less than two man-years and could run on hardware 'costing as little as $40,000'.

As for Unix now, I've no idea, but coming from that background, perhaps too many things have come to depend on that case sensitivity to be able to change it. On the other hand, perhaps its devotees simply wouldn't have it any other way...

CHRIS VENESS
chrisv@movable-type.co.uk

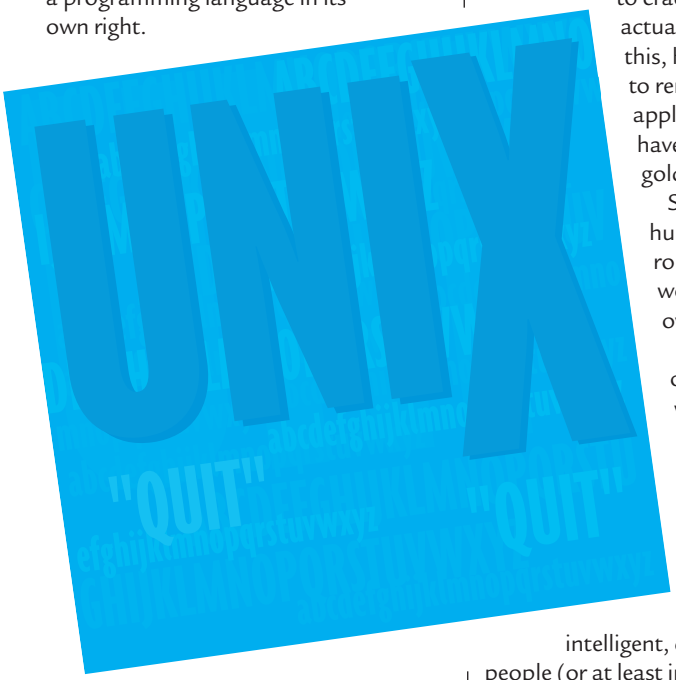
Brian Clegg replies >

I accept absolutely that Unix made sense 20 years ago, but things have moved on and it's no longer just the cognoscenti that are exposed to it, hence the argument! Thanks for writing.

WE'RE ALL ON THE UNIX CASE

I felt compelled to rise to Brian Clegg's challenge to explain what benefit case sensitivity has in the Unix operating system (*PCW*, September 1999).

The answer is buried deep in the roots of the origin of the operating system. The user interface is, uniquely, also a programming language in its own right.



This is unusual enough today, but in the 70s it was revolutionary. Can you think of one programming language that is not case-sensitive? Bear in mind the entire Unix OS works on case sensitivity, not *just* filenames. Also, remember that Unix and its user interface (running on minimal hardware) were designed to be slick and quick.

As for passwords, all it takes is someone to put the first, last or perhaps the penultimate character in their password as upper-case (or lower if all the rest is in upper) to make it easy enough to remember. And yet it is so much harder for someone to crack. If people can't actually remember to do this, how do they manage to remember to use their applications? They must have memories like goldfish.

So the benefit to humankind? Tight, robust code which works a treat. Unix all over, really.

I agree that the operating system was developed by, and intended for, human beings. But more precisely, it was developed by intelligent, computer-literate people *for* intelligent, computer-literate people (or at least intelligent people). Now, 99.9% of the Web is run by Unix servers because it stays up for months and sometimes years at a time without reboots, and because it does what it says it will do and works when it matters. If you want something that guides you by the hand with cotton gloves on, try Microsoft's IIS. As long as you don't mind the constant reboots/crashes and everyone else having access to your data that shouldn't, you should find the whole thing a breeze.

KEITH GRANT
Keefer@clara.co.uk

Brian Clegg replies >

I agree that keeping Unix lean and mean 20 years ago made sense, but I'd now argue that it isn't fit for exposure to human beings (as opposed to programmers) until it stops imposing its case sensitivity on the world. People simply don't work that way and it is lazy programming to expect the user to do the work rather than the computer; that's why we buy them, after all. I think there are several languages that aren't case-sensitive as far as variables go. I don't think Algol is and I know Basic isn't (although I suppose you'd argue that's not a language). Unix is reliable and I love its reliability, but that's no reason to be unfriendly.

I'll never be won over on the password issue. You can't expect people to know what case they're typing when they don't get an echo. Mixed case passwords would only be valid if you had mixed case echo characters, I think.

I loved Brian Clegg's comments (*PCW*, September 1999) about the helpful software that explains that: 'You are in reporting mode; to do this you should be in entry mode."

My favourite example was in the Focus database software that ran on a Vax. If you typed 'Quit' to leave the program, you received the helpful message: 'Type Exit to quit Focus!'

JOHN HOLLERTON
bogsoft@go.com

gadgets

compiled by Nik Rawlinson

iSee iBook iMminently

The iMac was a big hit, and Apple is hoping to repeat the success with the imminent release of the iBook, of which this is one of the first pictures. It features a 12.1in TFT display, a 300MHz PowerPC G3 microprocessor, built-in 56K modem and 10/100Base-T Ethernet networking, built-in CD-ROM drive, two built-in antennas and an internal slot to accept Apple's new AirPort wireless networking card. Oh yes, and still no floppy.

Contact Apple 0870 600 6010
www.apple.com/uk
Price $1,599 when released in the US this September

Project yourself

At just 4.3kg, the snappily named PLCXU10 is one of the lightest projectors on the market. It can also run without being connected to a PC – simply download your presentation onto a SmartMedia card and slip it into the slot on the side. A top resolution of 1024 x 768 and an image throw of up to 14.1m earn it a thumbs up in the *PCW* office.

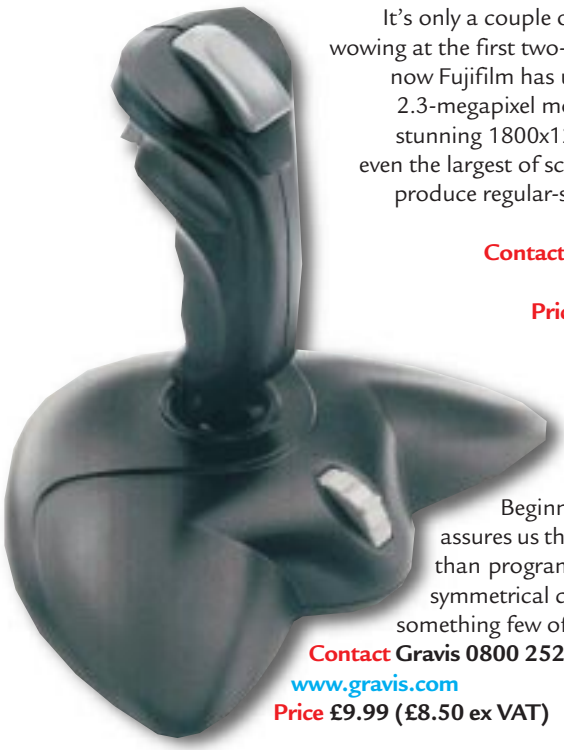
Contact Sanyo 01923 477221
www.sanyo.co.uk
Price Available on application

Snap happy

It's only a couple of months since we were wowing at the first two-megapixel cameras, but now Fujifilm has upped the ante with this 2.3-megapixel model. Taking photos at a stunning 1800x1200 resolution, it will fill even the largest of screens and scale down to produce regular-sized prints – just like the developer would do.

Contact Fujifilm 0171 586 5900
www.fujifilm.co.uk
Price £699.99 (£595.74 ex VAT)

Joy… on a stick



Beginners have everything, and now that even extends to their own joystick. Gravis assures us that the Destroyer 'enables new game players to focus on learning the game rather than programming the joystick'. Perhaps the best thing about it, though, is that the stick's symmetrical design makes it equally suited to both left-handed and right-handed gameplay – something few of its competitors can boast.

Contact Gravis 0800 252359
www.gravis.com
Price £9.99 (£8.50 ex VAT)

Her name is Rio

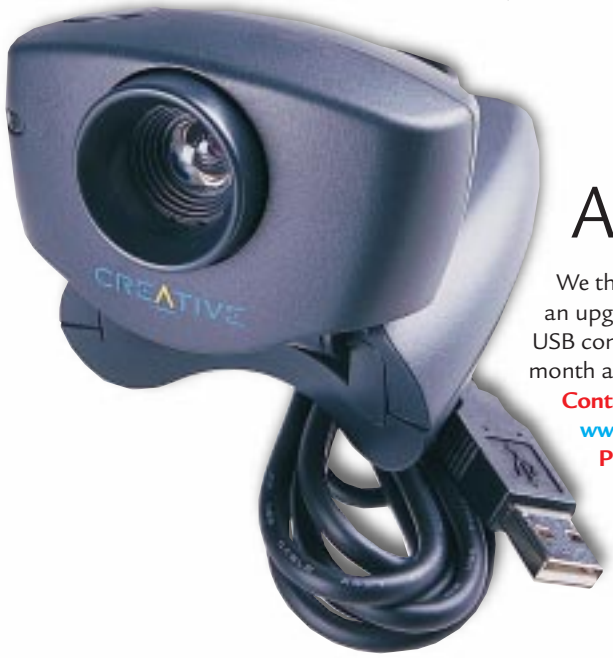
The original Rio was a hit with PC-owning music fans nationwide, and now it's been upgraded to become the cool see-through teal-blue PMP300. It's not battery-hungry, running for an impressive 12 hours on a single AA cell, it doesn't skip like a tape or CD, and, being smaller than a cassette, it will easily fit in your pocket so you can listen while you jog. Check out our full review on p88.

Contact Diamond Multimedia 01189 444400
www.diamondmm.com
Price PMP300 SE £156.22, headphone £12.47, leather case £18.72, 2x16Mb flash £62.47, import duty £63.73; total £ 313.61

Talk talk

The Quest looks like a dictation machine, but it's also an organiser. Your vocal notes can be organised into individual voice folders and you can even use it to create voice email for network delivery. Dropping it into the docking station means that just like a Palm organiser, you'll be able to synchronise it with your PC data.

Contact Dictaphone 01926 821111
www.dictaphone.com
Price £249.99 (£212.76 ex VAT)



All-seeing eye

We think the new WebCam III from Creative looks a little like a boxy dog. It's an upgrade to the egg-shaped WebCam II, and this time around you'll find a USB connection at the end of its generous 6ft lead. We put it to the test this month and you can find out what we thought on p82.

Contact Creative Labs 0118 934 4322
www.cle.creaf.com
Price £69 (£58.73 ex VAT)

Sudden surges – stopped!

Surge protection devices get smaller every month, and this month we have what we think is the smallest yet, the Surge Stop. Anything from a lightning strike to everyday fluorescent lighting can cause surges, but this handy little device can keep your notebook safe whether you're at home or away.

Contact Teleadapt 0181 233 3000
www.teleadapt.com
Price £14.09 (£11.99 ex VAT)

reviews

Using a regular digital camera to put your mug on the net has become somewhat old hat. With faster net connections and new streaming technologies, what people want now is full colour digital motion, and this month we take a look at two products that make this easy – the **WebCam III** from Creative Labs *[pictured, right]* and Sharp's **Internet Viewcam**, which made a brief appearance in our Gadgets section a couple of months back but is now available to buy and so returns for a full review. We also feature what has to be one of the cheapest PC upgrades ever – a tenner will now buy you an IRDA port for the back of your desktop machine. Why should it be just your PDA, notebook and phone that can take advantage of wireless communications these days? We're also going wireless on the networking front. We take a look at two wireless-networking solutions that are ideal for use in the home or a small office. One of the most desirable looking products to enter the office this month was the **EasyMate** from Packard Bell *[left]*. See whether this, and a couple of dozen other products, lived up to our expectations.

NIK RAWLINSON, REVIEWS EDITOR
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VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Ratings

★★★★★ Buy while stocks last
★★★★ Great buy
★★★ Good buy
★★ Shop around
★ Not recommended

Contents

Dell Dimension XPX T600

Power for the professional

For those who remain stubbornly loyal to the Intel Inside sticker, this high-end PC is a gamer's dream.

Dell is the last of the major PC manufacturers to base its systems solely on Intel processors. So it is no surprise that the company has been quick to adopt Intel's latest chip, the 600MHz Pentium III. Dell has taken care to keep this processor cool by installing a very large fan directly behind it. There's also a cowling that flows the air directly over the processor.

The CPU resides in an ATX motherboard, based on the 440BX chipset. Two of the three DIMM sockets are filled with an impressive 256Mb of PC100 SDRAM. The board also sports five PCI slots, along with one ISA and the AGP slot.

Occupying the AGP slot is a Diamond Viper V770 graphics card, based on the nVIDIA Riva TNT2 chipset. With 32Mb of memory, no resolution or colour depth should be out of your reach, in 2D or 3D applications. With the exception of hardware bump-mapping, this card supports just about every 3D feature, so if 3D gaming is what you're after, you won't be disappointed. Unfortunately, the monitor can't show the graphics card off to its full effect. Although there's nothing intrinsically wrong with the 19in Dell-badged display, we expected something a little better considering the high specification of the system. The image is well focused across the whole surface of the display, but the screen is noticeably rounded, especially when compared to the latest flat CRTs that have become popular of late. The OSD is fairly intuitive, using a rotating dial for adjustments.

Microsoft Office 2000 Small Business Edition rounds off the package

A SoundBlaster Live! Value card fills one of the PCI slots. This is a good sound card, although the Value version lacks the daughter card with the digital in and out ports. This is a particular problem considering Dell has included a set of Altec Lansing ADA880 speakers, a top notch speaker package with a built-in Dolby Digital decoder. The massive subwoofer has an SP/DIF input to receive the digital signal carrying the Dolby Digital information. Unfortunately, Dell hasn't included an MPEG2 decoder card or a sound card with an SP/DIF output, so the speakers can't be used to their full effect. That said, if you ever decide to add a decoder card, you're set for a surround sound treat. The speakers come with an infra-red remote control to make movie watching even easier. The only other expansion card is a US Robotics V.90 PCI modem.

Mounted vertically at the front of the system case is a 20Gb Maxtor hard drive. You're not likely to run out of storage in a hurry, but if you do need to transport or safeguard data, there's a 250Mb Iomega Zip drive. The third EIDE device is a 6x Toshiba DVD-ROM drive that reads CD-ROMs at 32x.

The keyboard is a Dell-badged model with good travel and break, making it easy to achieve a decent rate of typing, while a Microsoft Intellimouse takes care of pointer manipulation.

Rounding off the package is a copy of Microsoft Office 2000 Small Business Edition. Since MS Office is the premium productivity suite, it's a commendable inclusion with any PC.

The Dell didn't perform quite as well as last month's Panrix Fusion 600, turning in a SYSmark score of 233 and a 3DMark result of 4277. That said, at £1,649 ex VAT, it's considerably cheaper than the Panrix.

The Dimension T600 is a pretty good package and fair value for money. With the exception of the mismatched sound card and speakers, the components gel. If AMD's Athlon can't sway you from Intel, this Dell should suit your needs.

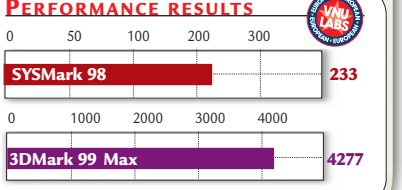
RIYAD EMERAN

PCW DETAILS

★★★★★

Price *£1,937.57 (£1,649 ex VAT)*
Contact *Dell 0870 152 4850*
www.dell.co.uk
Good Points *Good specification and reasonable price*
Bad Points *Poor pairing of speakers and sound card*
Conclusion *An impressive 600MHz Pentium III machine at an attractive price*

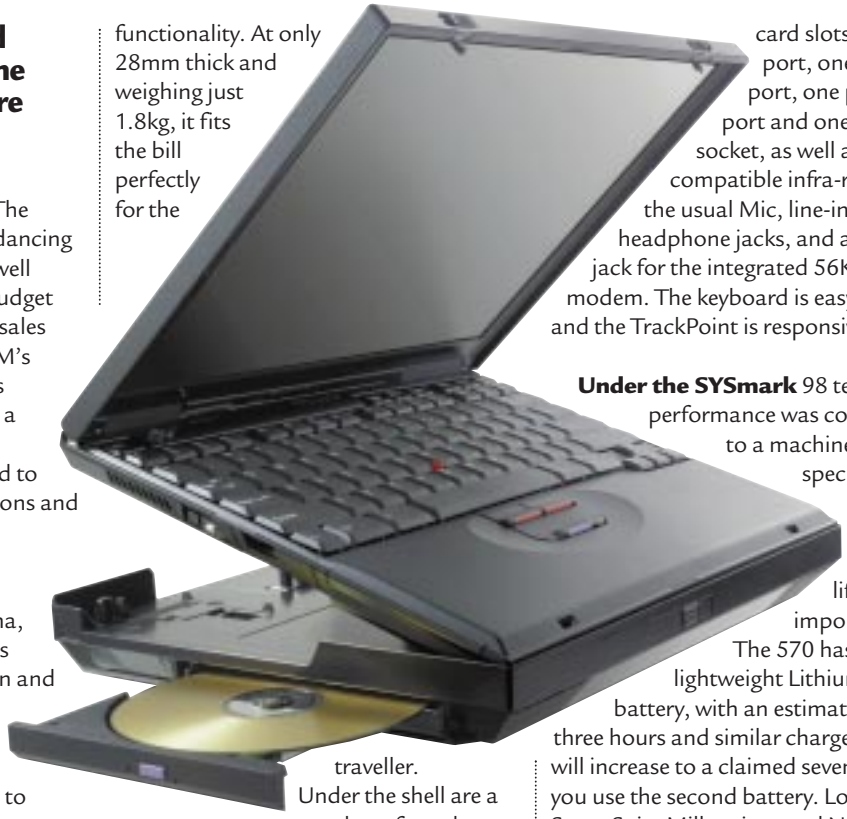
PERFORMANCE RESULTS



IBM ThinkPad 570
Top-notch notebook

Versatile, functional and light, this notebook is the perfect weapon if you are an IBM road warrior.

IBM is very clear about how it categorises notebook users. The company has all-singing, all-dancing desktop replacements aimed at well financed desk-bound workers, budget notebooks aimed at the humble sales force and finally – the jewel in IBM's crown – thin and light notebooks aimed at a user IBM describes as a road warrior. As these users are constantly travelling, all they need to do is check email, give presentations and do a little spreadsheet and word processing work.



IBM's first offering in this arena, three years ago, was the 560. This notebook was one of the first thin and lights, and had minimal drives. The 570 recognises that while road warriors do not want to carry much with them, they need to have access to other drives, such as a CD-ROM, Zip drive or DVD.

The original 560 had an external floppy and an optional external CD drive, and the new 570 is no different, with only the external floppy as standard. The most important improvement in the 570 is the UltraBase, IBM's name for its docking station. With this comes all the added functionality – two swappable UltraSlim bays capable of holding CD-ROM and DVD-ROM drives, LS-120 and Zip storage devices and an extra hard disk. If you need to increase the battery life, the UltraBase will hold a second battery. It even has a midi port attached for those corporate stress relievers – games. However this option is not cheap, costing a further £102 ex VAT before you even start putting in any drives. And there is no built-in network capacity, so you will have to use a PCMCIA Ethernet card to connect when you do hit base.

The ThinkPad 570 is certainly lightweight and packed full of functionality. At only 28mm thick and weighing just 1.8kg, it fits the bill perfectly for the traveller. Under the shell are a number of good components. Powered by a 366MHz Intel Mobile Pentium II, it's as fast as you're likely to need in the workplace. With 64Mb of SDRAM, upgradable to a maximum 192Mb, plus a 6.4Gb IDE hard drive, the 570 sits comfortably at the top end of the notebook ladder.

Once out of the office battery life takes on a new importance

The 13.3in TFT screen is impressive, with a resolution of 1024x768, and is capable of driving an external display at the same resolution. The ultra-slim nature of the 570 is evident here – the casing behind the screen is quite thin and any pressure is evident on the active-matrix display.

The 570 uses the NeoMagic MagicMedia 256AV graphics chipset, as favoured by many notebooks, and the 16-bit SoundBlaster compatible Crystal CS4280 audio chipset.

Any notebook worth its salt has a variety of ports for adding peripherals. The usual suspects are included on the 570 – two Type II (or one Type III) PC card slots, one USB port, one COM port, one parallel port and one PS/2 socket, as well as an IrDA compatible infra-red port, the usual Mic, line-in and headphone jacks, and a telephone jack for the integrated 56Kbit/sec modem. The keyboard is easy to use and the TrackPoint is responsive.

Under the SYSmark 98 tests, performance was comparable to a machine of similar specifications. Out of the office, battery life has new importance. The 570 has a lightweight Lithium Ion battery, with an estimated life of three hours and similar charge time. This will increase to a claimed seven hours if you use the second battery. Lotus SmartSuite Millennium and Norton Mobile Essentials are included.

IBM seems to have sat on its laurels with this machine. It has recognised that users need the flexibility offered by the UltraBase, but compared to other notebooks available, the base model 570 is under-specified and over-priced.

JIM HARYOTT

PCW DETAILS

★★★★

Price *£3,084.37 (£2,625 ex VAT), £118.67 (£101 ex VAT) for UltraBase, £119.85 (£102 ex VAT) for 24x CD-ROM drive*

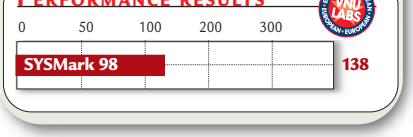
Contact *IBM 0870 601 0136*
www.ibm.com

Good Points *Size, weight and functionality*

Bad Points *Price, basic package would need additions*

Conclusion *A lovely notebook – slim, portable and powerful, but adding the extras that other manufacturers may include as standard makes it very expensive*

PERFORMANCE RESULTS



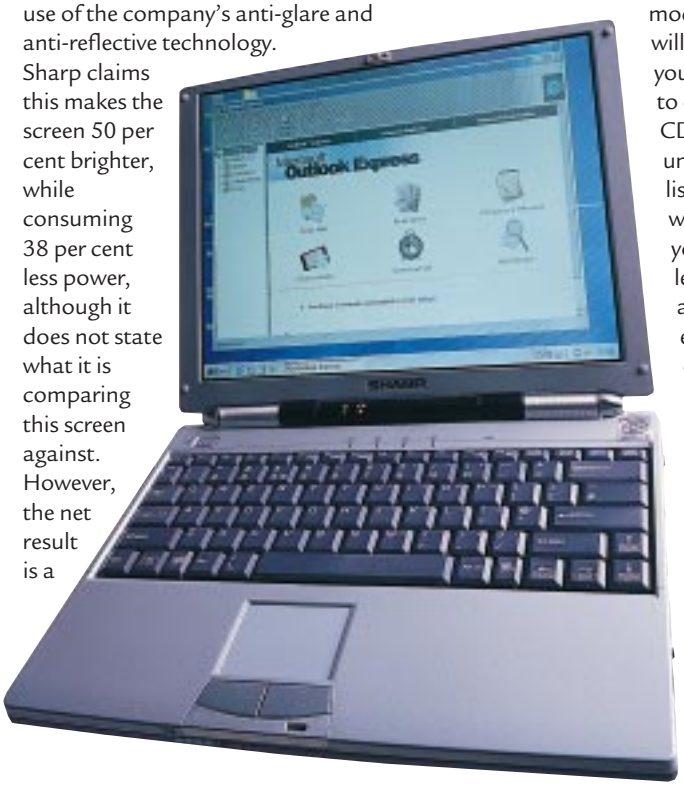
Sharp PC-A250 UltraLite Sub-notebook

Great looks and a screen to die for make the Sharp A250 a highly desirable travelling companion.

Tiny, sleek and extremely attractive, the Sharp PC-A250 certainly turns heads. Measuring just 262x210x 22mm, it fits into that category of sub-notebooks that run a full version of Windows 98, but are only marginally bigger than the larger Windows CE devices. Sub-notebooks have the advantage of being very small and light, but can also run any application you need, although the downside is that the battery life is usually only a couple of hours. However, despite its size it is well specified, with a Pentium II 300, 64Mb of RAM and a 6.4Gb hard drive.

The most impressive component in the UltraLite is the screen. Sharp has managed to squeeze an 11.3in display, with a resolution of 800x600, into this small form factor notebook, but this TFT is much better than that seen on most other mobiles in its class.

The screen is Sharp's own, making use of the company's anti-glare and anti-reflective technology. Sharp claims this makes the screen 50 per cent brighter, while consuming 38 per cent less power, although it does not state what it is comparing this screen against. However, the net result is a display that is very black before it is turned on and gives an extremely bright, sharp image.



Most TFT screens suffer from poor colour representation and low brightness, which makes them less than perfect for any graphical work. It also produces problems for viewing the display in certain lighting conditions, such as bright sunlight – a problem when you are likely to use this notebook in any number of different locations. The screen on this PC-A250, however, is bright enough to get over most of these problems and has the added advantage of having a very wide viewing angle, so it can still be seen well from the side.

The net result is a display which gives an extremely bright, sharp image

All the objects on the screen were pin-sharp, with no obvious fading or unevenness in brightness.

Aside from the hard drive, there are no drives in the chassis. The optional CD-ROM drive connects via the single PC Card slot. The lack of an internal modem means you will have to remove your external modem to connect the CD-ROM drive, but unless you intend to listen to music while on the move, you can probably leave the CD drive at home. The external floppy drive connects via a proprietary port on the side of the unit.

This drive is as thick as the notebook itself and almost as deep, so it is quite bulky, but it does have the advantage of containing three ports on the back – PS/2, serial and parallel. There is a single Type II PC Card slot, so you can't plug in Type III cards.

These extra ports on the drive are appreciated because none of them are present on the notebook. You do, however, get two USB ports, a VGA connector and an Ethernet port. Still, if you are using older printers or drives, such as a Zip drive, you will need to daisy-chain these off the floppy drive – a cludgy solution.

The PC-A250 has two batteries, one internal and an optional external one, which clips on to the back of the notebook, as seen on the Compaq 5100 a few years ago. This time, however, it is not a carry handle. In fact, you would be foolhardy to pick up the notebook by the battery because it is only connected by the flimsiest of connectors. The battery is only connected by two plastic clips, which look pretty insubstantial and look as though they might break easily. There is also a chance that the battery will move and become disconnected.

Welcome additions are the built-in 56K modem and the little bit of suede on the bottom of the notebook to stop it from slipping around – a real bonus when using the notebook on a train.

ADELE DYER

PCW DETAILS

★★★★

Price *£2,167.88 (£1,845 ex VAT), optional CD £235 (£200 ex VAT), extra battery £182.13 (£155 ex VAT), PC and CD bundle £2,367.63 (£2,015 ex VAT)*

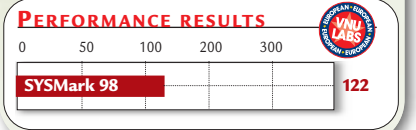
Contact *Sharp 0800 262958*
www.sharp-usa.com

Good Points *Lovely screen, built-in modem*

Bad Points *Outsized external floppy drive*

Conclusion *A little more expensive than some ultraportables, but still worth considering*

PERFORMANCE RESULTS



Metacreations Poser 4
3D design and animation

A 3D package that is so easy to use it is guaranteed to bring a smile to your faces, and a nod, and a wink...

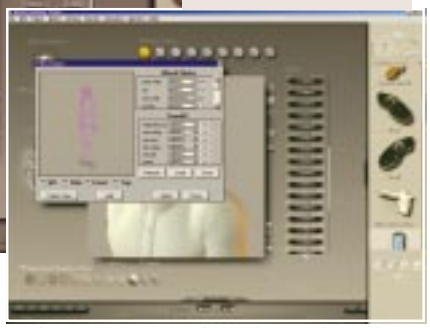
It says on the box: 'The premier 3D character animation and figure design tool' and you'd be hard pushed to argue. Poser 4 is to figure drawing what CAD is to technical drawing – it provides all the parts you need and the tools to put them together to create realistic looking 3D people. Humans are only part of the story. Poser 4 introduces a library of animal figures and even robots.

Version 4 is a marked improvement on 3, offering a vast increase in control over models and their environment as well as more of everything that version 3 already had to offer. The models themselves offer far greater scope for manipulation, including facial expressions and manual dexterity, morphable facial features and musculature. Lighting and camera controls have been brought up to the standard found in other 3D applications, while you can position lights wherever you want, and control their angle and intensity. You can also view figures from preset and user-placed camera positions, all fully adjustable along three axes.

Additions include a much wider range of poseable figures, a bigger wardrobe, a wider choice of realistic hairstyles and a new library of props. Animation features have been beefed up with an automatic walk designer and a timeline-based animation controller.

Users of other Metacreations products will feel at home with the interface that makes light work of complex tasks. A resizeable floating view window displays the figure viewed from the current camera position and is surrounded by control palettes that look like physical objects rather than products of a software developer's toolbox.

Lighting controls are manipulated by positioning lights around a sphere, while camera positions are selected by clicking on body part icons, pan, tilt, rotate and zoom by means of a four-point compass.



◀A FROWN, A SMILE, OR ANY OTHER EXPRESSION YOU CARE FOR, AND CHECK OUT THAT WARDROBE. ▼WITH THE WALK DESIGNER ANIMATING WALKING FIGURES IS A STROLL IN THE PARK.

Library palettes containing complete figures (male, female, children, animals, robots), action poses, faces, hairstyles, preset hand poses, props, lighting and camera positions are accessed through a tiny ribbed tab on the right of the screen.

The edit palette comprises nine tool buttons that you can use to rotate, twist, scale, group, colour and adjust elements. All the editing tools work in two ways. Dragging on a body part with a selected tool applies the transformation to the part, dragging on the tool button applies the transformation to the entire figure.

Greater control is provided by parameter dials – adjusted using a thumbwheel or numerical input. These let you alter an element's attributes. Parameter dials for the head include open lips, smile, brow position, blink and mouth positions for certain vowels and consonants.

Using the parameter dials, it's possible to raise eyebrows to a quizzical point, close an eye to form a wink and change expression from a deep frown to a broad grin. Parameter dials for hands let you alter the position of fingers and thumbs from widely spread to a tight grasp, scale, taper, make rotational and side-to side movements. The Superhero morph parameter can pump up a figure to Schwarzenegger-like proportions.

Poser 4's animation features include an automatic walk designer and a sophisticated timeline-based animation palette that automatically interpolates and inserts intermediate frames based on user-defined keyframes. The walk designer lets you create a blend of walking styles including run, shuffle, sneak and strut, and to tweak secondary parameters such as head bounce.

The additional content on the second CD turned out to be a disappointment – it was mostly reworked Poser 3 figures and other existing material. Some new figures or wardrobes would have been welcome. The few sample animations, however, particularly Sumo Baby, superbly demonstrate the range of posture and movement, facial expression and camera movement achievable.

KEN MCMAHON

PCW DETAILS

★★★★

Price *£199.99 (£170.20 ex VAT), upgrade £84.99 inc VAT*

Contact *Metacreations 0181 358 5858 (Computers Unlimited)*
www.metacreations.com

Good Points *Much improved control and animation, better hair and clothes*

Bad Points *Additional content disappointing*

Conclusion *If you're into figure-based illustration and animation, you can't do without it*

System requirements *PC: Pentium, Win95 or later, 32Mb RAM (64Mb recommended), 240Mb disk space*
Mac: System 8 or later, memory and disk requirements as above

Sony Vaio PCG-F290
Cutting edge notebook

If your perfect partner has to be fast and well-equipped, then this addition to the Sony stable is for you.

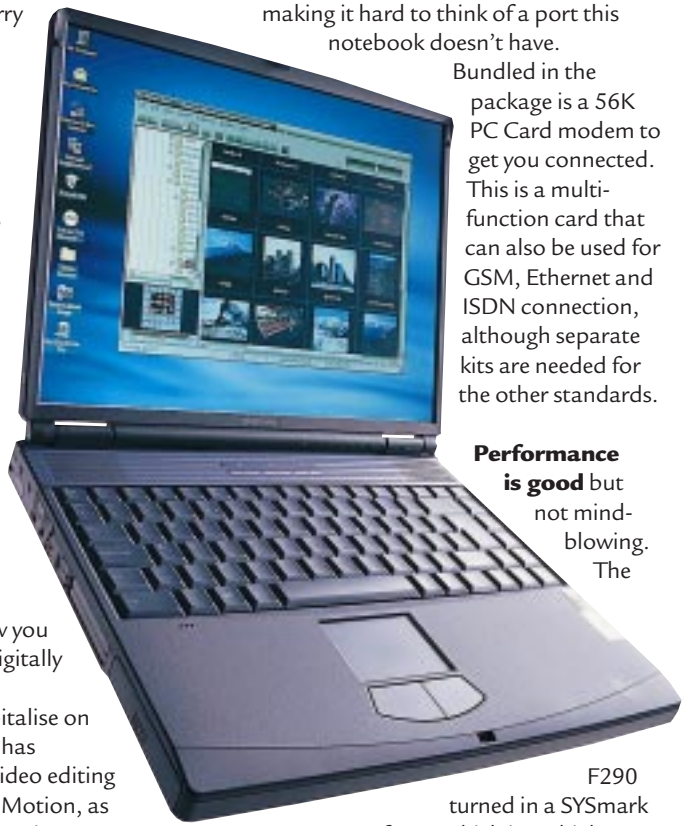
The PCG-F290 is the latest power notebook in the Sony Vaio range, sporting a powerful 400MHz Pentium II processor and 128Mb of RAM. That's quite a lot of power for a mobile solution, but this is no ordinary mobile computer. The F290 is being aimed at the mobile video editor and as such, it has to be fast and well equipped.

The F290 isn't a lithe beast like its 505 cousins, although it's not particularly bulky either considering the components that Sony has squeezed into it. Weighing in at 3.5kg including the floppy drive and battery, it's also not particularly heavy.

As is usually the case with a Sony product, the design is stunning. The casing is a two-tone affair, comprising the usual Sony purple coupled with an attractive dark grey. The dimensions are slightly larger than the F190 reviewed in the May 1999 issue, but this is due to the increased screen size. The TFT display now measures 15in, although it can still only handle a resolution of 1024x768. No dead pixels are evident, but the lighting is a little uneven, with the top appearing slightly darker than the bottom of the display. The 2.5Mb NeoMagic graphics chipset is more than capable of getting the best out of the internal display, although it could prove limiting if the notebook is connected to an external monitor.

Storage comes courtesy of a 6.4Gb IBM hard disk. This isn't a huge amount of space by desktop standards, but it's fairly impressive in the notebook world and large enough to serve the needs of a mobile video editor. To the right of the chassis is a 4x DVD-ROM drive and a floppy disk drive. Although the floppy drive can be removed, it's good to see that all the peripherals can be accommodated in the chassis, rather than having to carry around extra bits and pieces.

On the left hand side are two PC Card slots, headphone and microphone jacks and the power switch. There's also an IEEE1394 or FireWire port. It's this inclusion that puts Sony's notebooks in a market of their own. Since Sony's DV (Digital Video) camcorders have FireWire outputs, this port will allow you to import video digitally for editing on the notebook. To capitalise on this feature, Sony has bundled its own video editing software, DVgate Motion, as well as Adobe's Premiere LE. Even though a serious video editor is likely to have software of this type already, it's a commendable inclusion.



The inclusion of a FireWire port puts Sony's notebooks into a market of their own

With the increased form factor due to the larger screen, there's no problem fitting in a full-size keyboard. The keyboard can often make or break a notebook, so we're happy to say that you won't be disappointed with what's on offer on the F290. That said, it's not as impressive as the keyboard on the IBM ThinkPad 570 (reviewed page 74). The touch-pad is a fine example and pointer manipulation is the simplest of tasks. Unfortunately, the software for the touch-pad wasn't loaded, so we couldn't turn off the tapping option, although the touch-pad is far enough away from the space bar for this not to be a problem.

At the rear of the unit are serial, parallel, VGA, PS/2 and USB connectors, making it hard to think of a port this notebook doesn't have.

Bundled in the package is a 56K PC Card modem to get you connected. This is a multi-function card that can also be used for GSM, Ethernet and ISDN connection, although separate kits are needed for the other standards.

Performance is good but not mind-blowing. The F290 turned in a SYSmark score of 147, which is 15 higher than the 366MHz Pentium II equipped F190 scored in May. With a price of £2,559 ex VAT, the F290 is likely to make quite a dent in your wallet. However, it is a beautifully built mobile computer and if you want to do video editing on the move, it's your best option.

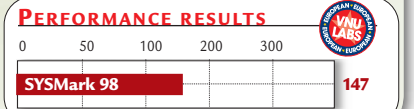
RIYAD EMERAN

PCW DETAILS

★★★★

Price *£3,006.82 (£2,559 ex VAT)*
Contact *Sony 0990 424424*
www.sony.co.uk
Good Points *Very well specified, IEEE1394 port for DV editing*
Bad Points *Pricey, not as fast as we expected*
Conclusion *A well built, cutting edge notebook computer for the mobile DV enthusiast*

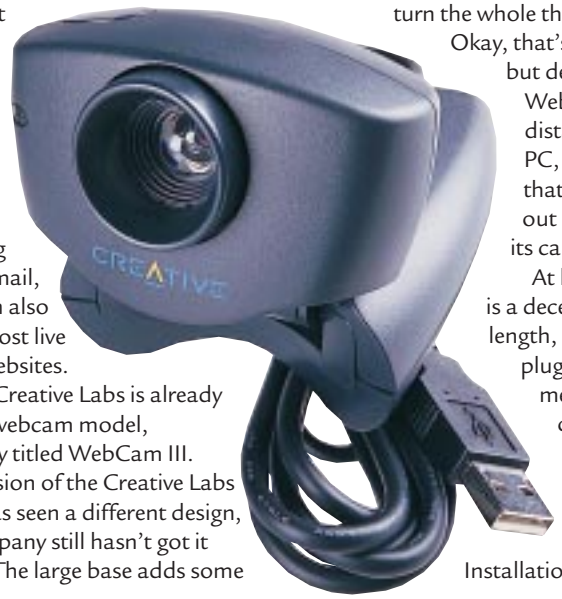
PERFORMANCE RESULTS



CreativeLabs WebCam III

Now you can be seen wherever you want without leaving your desk.

Video cameras that plugged into a PC were always a solution looking for a problem, but then the Internet took off and *voila*, the webcam was born.



Webcams let you send pictures across the Internet for such things as low-end video conferencing and video email, and they can also be used to post live images to websites. The diverse Creative Labs is already on its third webcam model, imaginatively titled WebCam III.

Each version of the Creative Labs WebCam has seen a different design, but the company still hasn't got it quite right. The large base adds some much-needed stability to the unit and the hinge affixed to the camera lets you position the lens vertically through 90 degrees. What you can't do, however, is position the lens horizontally, unless you turn the whole thing round.

Okay, that's no problem, but depending on the WebCam's distance from the PC, you may find that it gets tugged out of position by its cable.

At least the cable is a decent six feet in length, and the USB plug on the end of it means there is no chunky parallel port adaptor to poke out of the back of your PC. Installation is as easy as you'd hope for with USB and there's even a green LED on the WebCam to tell you it's powered and working.

Despite a maximum still image resolution of 640x480 in 16.7 million colours, the WebCam's image quality isn't the best for these devices. The auto brightness and exposure settings leave everything a little dim and the banding filter is best left off.

JULIAN PROKAZA

PCW DETAILS

★★★

Price *£69 (£58.73 ex VAT)*
Contact *Creative Labs 0118 934 4322*
www.cle.creaf.com
Good Points *Neat design, simple connection*
Bad Points *Image quality bettered by the competition*
Conclusion *Though cheap and relatively cheerful, the WebCam III can't quite manage the crisp image quality of, say, the Philips USB PC video camera*

Easy CD Creator 4

RECOMMENDED PERSONAL COMPUTER WORLD

It feels good, it looks great – CD writing software that really does have everything.

Without a doubt, Adaptec's Easy CD Creator software is the de-facto standard for anybody wanting to create their own CDs. With the price of CD recorders and the media they use at an all-time low, Adaptec has released a new version of the software to take advantage of the new market potential.

It's clear that a lot of work has been put into ironing out all the problems with the older versions of the software.

While some of the changes may seem only cosmetic, they really improve the feel of the program. Both parts of the software – those for creating audio and data CDs – consist of a drag and drop method of adding the files you want to write to CD, sticking with the familiar explorer-style functions. Looking deeper reveals better functions, such as the ability for MP3 files to be written as audio tracks without user intervention. Perhaps the best improvement lies in the CD cover editor, which now works very well.

By no means does the package stop there: it includes additional software for creating picture discs and auto-running video discs. Should you still think this isn't enough, you won't be disappointed with the bundling of MGI's Photosuite and Videowave, which lets you edit pictures and video files before writing to CD.

Finally, there is an image-based backup program which will copy the entire contents of your hard drive to as many CDs as needed, allowing you to recover everything in the event of a disaster. If you have, or are thinking about getting a CD writer, then you simply can't be without this software.

DAVID LUDLOW

PCW DETAILS

★★★★★

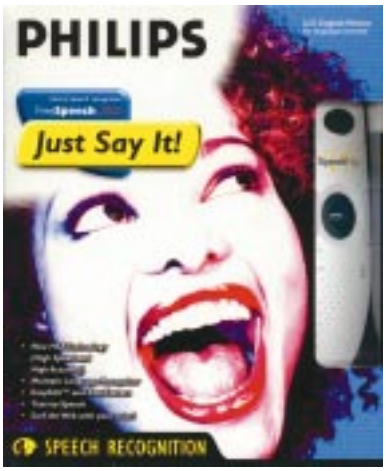
Price *£57.58 (£49 ex VAT)*
Contact *Adaptec 01276 854500*
http://cdr.adaptec.com
Good Points *Easy to use interface and a large range of options*
Bad Points *The large number of programs may go mostly unused*
Conclusion *Everything you could ever want to use to create your own CDs, and all at an extremely good price. Superb for anyone with a CD writer*
System requirements *Pentium 166MHz, 90Mb recommended free hard disk space, 32Mb of RAM, Windows 95/98 or NT*

Philips FreeSpeech 2000

Here's what you need if you don't think you're getting the recognition you deserve from your PC.

Philips entered the PC speech recognition market last year with FreeSpeech 98, a cheap, no-frills package that originally came without a microphone. FreeSpeech 2000 is now available in two versions – with a normal headset mike or with the Philips SpeechMike, a combination handheld mike and trackball.

FreeSpeech 2000 is a general-purpose continuous speech package that lets you dictate text straight into most popular applications. It also functions as a command and control package, letting you navigate Windows 98 without touching the keyboard. Unlike its predecessor, it supports multiple users, has text to speech (courtesy of IBM), supports relatively complex macros and comes with a microphone. It supports 13 languages out of the box, which, given the price, makes FreeSpeech 2000 good value. The package remains 'modal', so to switch between dictation and



command modes you need to click a button, but if you have the SpeechMike a dedicated button takes care of this.

As is the norm, FreeSpeech 2000 requires enrolment to deliver the highest recognition accuracies – we gave it 45 minutes of dulcet tones. The effort was well worth it: we were rewarded with some of the best initial recognition accuracies we've come across. Correction is a simple process too.

ROGER GANN

PCW DETAILS

★★★★

Price *with headset £79.95 (£68.04 ex VAT), with SpeechMike £124.95 (£106.34 ex VAT)*

Contact *Philips Speech Processing 01206 755504 www.speech.philips.com*

Good Points *Impressive levels of accuracy, multi-language support, natural language support*

Bad Points *Still modal, number handling not as smart as rivals*

Conclusion *FreeSpeech 2000 is just made for the single European market: support for 13 languages makes it very good value. Delivers, fast, accurate text*

System requirements *Pentium MMX 166/48Mb RAM, 100Mb disk space – Pentium II recommended, SoundBlaster-compatible sound card, CD-ROM drive*

Modular PCTV Tuner

RECOMMENDED PERSONAL COMPUTER WORLD

Slouch on the couch and tune in to the latest television channel with Modular Technology.

If you're getting fed up with using your computer for nothing more entertaining than Excel spreadsheets and a bit of word processing, why not transform it into a television with the help of the PCTV Tuner card from Modular Technology?

Installation is just a case of plugging the card into a PCI slot and connecting a TV aerial, and the world of television is your oyster. All the usual channels are found automatically – weaker signals can be manually tuned. The PCTV Tuner Card doesn't detect the station name, so you have to enter this afterwards.

Using your mouse to change channels can become irritating, especially if you are sitting away from your computer. For an extra £25, couch potatoes can buy a remote control, which transmits to a 'magic eye' that sits on your monitor and plugs into the joystick port.

The TV images are displayed within a resizable window on the desktop, which offers full or wide-screen viewing, while the superb Nicam sound is fed through your existing sound card. Depending on the signal, the pictures can be remarkably clear. A really neat aspect of the PCTV card is the mosaic function, which allows nine thumbnail channels to be displayed on the screen at one time – channel surfing made even easier.

In addition to Fastext, the Teletext facility uses hyperlinks to jump to other pages, much like Internet browsing. Pages are stored for immediate retrieval and two or more pages from different channels can be viewed at once. Text can also be copied and manipulated much as in a word processor.

LUKE PETERS

PCW DETAILS

★★★★★

Price *£60 (£51.06 ex VAT) with remote control £85 (£72.34 ex VAT)*

Contact *Modular Technology 01869 321323 www.modulartech.com*

Good Points *Good value for money, extended teletext features, NICAM stereo sound*

Bad Points *Adding the remote bumps up the price*

Conclusion *Not just an extra TV for the home, but one that includes Nicam stereo sound, excellent teletext features and video capture facilities*

System requirements *Windows 95/98, Pentium 200MMX processor, 16Mb of RAM, 5Mb of free hard disk space, sound card, DirectX 5 or later, high colour 16bit VGA monitor*

Packard Bell EasyMate 800

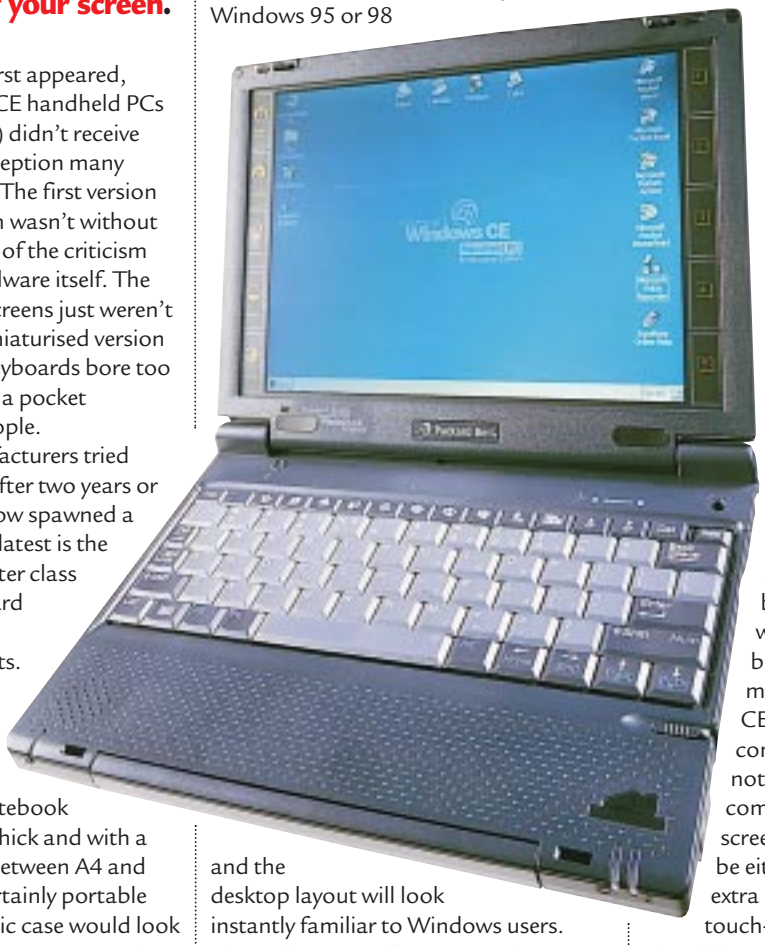
Jupiter class notebook

For those who like their notebooks slim and stylish – and you know what they say about the size of your screen.

When they first appeared, Windows CE handheld PCs (or H/PCs) didn't receive quite the rapturous reception many would have hoped for. The first version of the operating system wasn't without its problems but much of the criticism was levelled at the hardware itself. The murky monochrome screens just weren't up to handling this miniaturised version of Windows and the keyboards bore too close a resemblance to a pocket calculator for most people.

Undaunted, manufacturers tried again and again and, after two years or so, Windows CE has now spawned a myriad of devices. The latest is the sub-notebook size Jupiter class and this is where Packard Bell's first foray into Windows CE devices sits.

Superficially, the EasyMate 800 resembles one of the new breed of super-slim, ultra-portable notebook PCs. Just over an inch thick and with a footprint somewhere between A4 and A5, the EasyMate is certainly portable and the dull silver plastic case would look almost stylish if the plastic it was made from wasn't quite so flimsy.



Once inside, you'll be pleased to note the large keyboard and impressive 9.4in diagonal screen. There's no obvious pointing device, though, and Packard Bell has opted to stick with a touchscreen and stylus for the EasyMate rather than a touchpad.

It's only when you press the power button on the EasyMate that it becomes apparent that this is no ordinary notebook. Zero second boot time is known as instant-on and it's a breath of fresh air after all the hanging around involved in loading other versions of Windows. The 800x600 screen – the largest on any H/PC so far – makes Windows CE difficult to tell apart from Windows 95 or 98 and the desktop layout will look instantly familiar to Windows users. This is the main selling point of H/PCs, as it lessens the steep learning curve associated with many handheld computers.

'Instant-on' is what zero second boot time is known as and it's a breath of fresh air

Windows CE is different from its bigger brethren, though, and although data can be shared between H/PC and desktop applications, the applications themselves cannot. Thankfully, Windows CE Professional – as used on the EasyMate – comes with pretty much everything a user would want right from the box. The 'Pocket' versions of Word, Excel, Access, Internet Explorer and the bunch of Outlook-like applications have a sufficiently rich feature set, although Pocket PowerPoint is still limited to displaying presentations and cannot create them. If you're interested in the EasyMate as a PDA, forget it, it's just too big. As a replacement for a notebook PC, however, it's an interesting proposition. Many notebook users lug around a few kilograms of hardware just to write documents on the train – something that can be achieved just as easily with the EasyMate. In fact, the EasyMate can just about replace a notebook for many tasks and the claimed eight-hour battery life means it can replace one for longer as well.

At the risk of ending on a bum note, the EasyMate isn't without its drawbacks but the biggest isn't its fault. No matter how versatile Windows CE is, it's still intended as a companion to a PC, whereas a notebook PC operates completely independently. The screen isn't as clear as it could be either, no doubt due to the extra layers needed to make it touch-sensitive, and there really should be a way to keep the stylus to hand when you're typing. Speaking of typing, the keys could be a touch bigger and further apart, since even medium-size fingers will find it a little cosy.

JULIAN PROKAZA

PCW DETAILS

★★★★

Price *£799 (£680 ex VAT)*
Contact *Packard Bell 0990 500049*
www.packardbell-europe.com
Good Points *Large screen, plenty of ports, good application suite*
Bad points *Cramped keyboard, cheap finish*
Conclusion *If you're thinking of buying a notebook for use on the move, the EasyMate 800 is worth consideration, but remember you need a PC to make the most of it*

Borland JBuilder 3
Java application builder

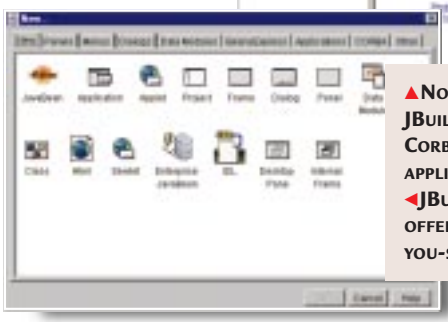
If it's beans, tools, wizards and widgets you're after, then JBuilder 3 has everything you could ask for.

Borland's Java development tool, JBuilder, provides click-and-drag visual programming, targeting any Java 2 VM (virtual machine), although this is currently only fully available on Windows or Solaris. You can also configure JBuilder to compile for earlier versions of the JVM. JBuilder itself still runs only on Windows, although there are plans to move it to other platforms, and Borland demonstrated a 100% Java version of JBuilder, running on Sun's Solaris operating system at the last JavaOne conference.

JBuilder is useful for general-purpose Java work, but Borland would really like you to use it with Application Server, an expensive suite of components including VisiBroker and some clever Java applications for managing and tuning distributed applications. Parts of this come bundled with the Enterprise edition. The two other JBuilder versions are the Professional, for database work, and the Standard, which provides the basics.

A JBuilder application starts with a new project. Through project properties you can set the target JVM, the style of generated code and other global options. Next, you add other components such as an application, applet or servlet, custom classes or JavaBeans. The project workspace includes a browser for navigating project files and components, an editor with both source code and visual design views and an inspector for setting properties or generating event handlers. A key feature is two-way coding, which means that edits can be made either visually or in code without any problem.

Although there is a full set of JavaBean components, wizards and tools, there are several component sets with overlapping functionality. Swing is the standard Sun widget set used in JDK (Java Development Kit) 1.2. In the dbSwing set these are enhanced to have data-aware functionality. JBCL (JavaBean Component Library) is the original JBuilder component library, but this is rendered more or less obsolete by Swing and dbSwing. You can also use AWT components for JDK 1.02 compatibility.



▲NOW AT VERSION 3.0, JBUILDER IS FOCUSED ON CORBA AND DATABASE APPLICATIONS
◀JBUILDER'S NEW DIALOG OFFERS A FULL RANGE OF GET-YOU-STARTED OPTIONS

Much of the focus in JBuilder is on database connectivity. DataExpress is the brand name for JBuilder's database architecture, which separates user interface, datasets and database connections. A DataStore component is itself an embedded database, letting you cache data in a local file for good performance on a network or for disconnected use. Unfortunately, it only comes with the Enterprise version and you need additional licences to deploy it. The model is stateless, so connections are only made when data is being accessed or saved, ideal for network or Web applications. In JBuilder 3, DataExpress has been separated from JBCL, so you can use it with dbSwing.

Other new features in JBuilder include a help viewer, with a long overdue full text search, and an application generator for multi-tiered Corba projects. A package migration wizard helps with the tedium of updating class names in line with revisions in JDK 1.2 and the development environment is enhanced. In fact, the main reason for getting JBuilder 3 is its JDK 1.2 components and improved database features.

This is an excellent Java application builder and the best all-round choice if your system is up to it. However, the help viewer gobbles vast amounts of memory and it is slow if it needs to page to disk.

Our hunch is that Java servlets doing XML generation and parsing will often prove more manageable and productive than JBuilder 3. If your Java interest is in general purpose applications, or you need to target JDK 1.1 or lower, JBuilder is not often relevant. Even so, at version 3.0, JBuilder has matured into a highly usable Java application builder

TIM ANDERSON

PCW DETAILS

★★★★

Price *JBuilder 3 Standard £98.99 (£84.26 ex VAT), 3 Pro £527.58 (£449 ex VAT), 3 Enterprise £1,996.33 (£1,699 ex VAT)*

Contact *Inprise/Borland 0800 454065 www.borland.com*

Good Points *An excellent range of components, Java 2 support, easy switching from code to visual editing, strong database architecture*

Bad Points *Performance remains a problem and online help is slow. Focus on high-end distributed database applications is irrelevant to many users*

Conclusion *An outstanding Java development tool but needs a big system to run it. Good value in its standard edition but expensive otherwise, particularly if you need deployment licences*

System requirements *Pentium 166, Windows 95/98 or NT, 96Mb RAM and 150Mb disk space*

Sharp VN-EZ1

Suddenly it's EZ-peezy to get video onto the Web.

How do you get a short video clip onto the Internet? Film your subject with a camcorder, digitise it, then compress and reformat it into a shape and size that befits the online medium – a bit of a pain really. Sharp's VN-EZ1, more charmingly known as the Internet ViewCam, makes this process a doddle.

You'd be forgiven for mistaking the EZ1 for a digital camera, and indeed it can fire off 640x480 pixel stills. At 81x90x42mm and 240g, it's lighter and smaller than you'd think too. However, by employing the heavily compressed MPEG-4 format, the EZ1 can capture between one and 20 minutes' worth of moving video (plus mono sound) onto the supplied 4Mb Smart Media card. There are five quality modes to choose from: four operating at 160x120 pixels and five to 15fps, and one at 320x240 pixels and two to five fps; there's even a time lapse function. Smart Media cards are available up to 32Mb in size, boasting between 10 minutes and almost 2.5 hours.

The EZ1 is designed to produce video for online distribution only, so there's no TV output or serial port. Instead, Sharp has supplied a floppy disk adaptor to quickly read inserted Smart Media cards. Video is stored in Microsoft's new Advanced Streaming Format, ASF, which allows updated media players to start playing the file without fully downloading it. Artifacts are present in the video, but it's recognisable and, crucially, small. A 20 second clip on the middle setting measured only 165Kb.

Existing camcorder owners may find better value fiddling with a video capture card, but the EZ1 really is the simplest and most fun way to get compact video files on the Web.

GORDON LAING

PCW DETAILS

★★★★

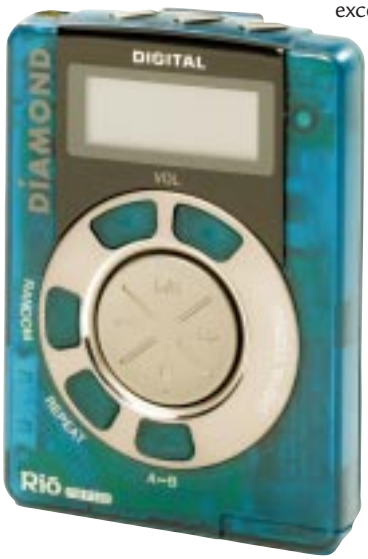
Price *under £600 TBC*
Contact *Sharp 0800 262958*
www.sharp-world.com
Good Points *Compact device for making compact movies*
Bad Points *Capture card cheaper for camcorder owners*
Conclusion *Easiest and quickest way to get video online*

Diamond Rio PMP300 SE

MP3 killed the radio star! Check out this stylish mobile assassin.

Diamond's notorious MP3 player is available in a teal-blue, 64Mb version from its US website <www.diamondmm.com>. A set of accessories is also available, so we decided to buy the lot.

The player can store about an hour of music, encoded at 128Kbit/sec, which is more than enough for a portable player. It also takes 3.3v SmartMedia cards for extra storage space. The bundled software handles encoding and transfer to the player, which takes a rather slow minute per track.



The player's buttons are difficult to use, being too flat to discern by touch alone. So we tried the remote control headset, which has a control dongle on its cord. Again, the buttons are too small and fiddly but at least you can clip the remote within eyesight. Another downside is that the player's display doesn't provide much info, such as the track name.

But it is a good player. Sound is excellent for MP3 and a portable device, the batteries last for about 10 hours and it doesn't skip while jogging, although this feature went untested.

You can – and we did – get a leather belt clip case that does little but protect the player and let you carry two SmartMedia cards and a spare AA.

The 32Mb PMP300 is available off the shelf and Diamond is soon to launch an upgrade, the PMP500, also with 64Mb but with a USB connector. Creative and Casio are also launching devices with features such as FM tuners.

MP3 players will catch on but they're still in the geeky domain. To encode – or steal from the Net – MP3 tracks and then upload to a player seems a hassle. Why not get an MD player for now?

PAUL SMITH

PCW DETAILS

★★★

Contact *Diamond 01189 444400*
www.diamondmm.com
Price *PMP300 SE £156.22, headphone £12.47, leather case £18.72, 2x16Mb flash £62.47, import duty £63.73, total £313.61*
Good Points *Light, long-lasting and cool. A bit like Wrigley's Spearmint, then*
Bad Points *Not the best design and not the cheapest way of listening to music*
Conclusion *Probably best to wait for next-gen MP3 players*

Proxim Symphony and Diamond Homefree

Ever wished your PCs would talk to each other and share things – without getting their wires crossed?

If you are one of the lucky few who has more than one PC at home, but always seem to want the file or to use the printer that is on the other machine, then you need to create your own network. The Symphony and Homefree offerings from Proxim and Diamond respectively do just this, without a wire connecting the two cards.

Aimed at the home and small business markets, these products allow you to share whatever files and devices are in the networked machines. The theory is that this removes the need for a separate CD-ROM, printer, modem or second phone line as they can all be shared across your network. And all this at an optimum claimed transfer speed of 1.6Mbit/sec for the Proxim and 1Mbit/sec for the Homefree.

The first thing that you have to do with Proxim's wireless ISA card is plug in the antenna. This allows you to move just the antenna rather than the whole computer. We felt that the installation program was more user-friendly than the Homefree, although we had to be careful to read the comprehensive instruction manual thoroughly to install everything successfully. Once set up, file and device sharing worked successfully, as did Internet sharing. We found browsing to be slightly slower on the laptop that was sharing the modem in a desktop PC.

Being able to wander around browsing the Internet was impressive

The speed at which you can access the Internet will be affected by a number of factors. The quality of the shared modem and phone line are two, but the data transfer speed between the shared devices is another. This in turn depends on factors such as the distance between the PCs and the thickness of any walls or other obstructions between them. However, provided only one computer is using the connection at one time, this should not prove too much of a problem. Where connection speed will really suffer, however, is when two users request a page at the same time, or if one is downloading a file while another is browsing. If your primary objective in networking two computers is that they can both use the Internet, you would be better advised to install a second phone line. That said, being able to wander around our building with a notebook browsing the Internet was an impressive achievement – the speed of the connection remained the same at a distance of 50 feet as it did at three feet.

We also tested the PC Card and ISA versions of Homefree. With the same claimed range as the Symphony kit (150 feet) and a similar set of features, there is little to choose between them on paper. The installation procedure is less user friendly than Symphony's – using Windows' Add New Hardware wizard, the configuration screen requires you to press both the share files and share Internet buttons to complete the process, even if pressing these buttons is not appropriate. Once beyond this minor quirk, however, the Homefree shares files and devices as well as the Symphony. We tried sharing Internet access using a notebook as the machine with the modem, but the combined efforts of the VNU Labs and Diamond's technical support could not make it function.

Overall, we found the Symphony to be the better product. The fact remains, though, that by buying either of them you would be setting up a network in a more expensive way and have a slower data transfer rate than traditional wire. There are so many wires coming out of the average PC anyway, you would need a very specific reason to remove a single network cable from the equation.

JASON JENKINS

PCW DETAILS

★★★★

Proxim Symphony

Price *Expected to be around £115 for the PCI/ISA card (£97.87 ex VAT) and £155 for the PC Card (£131.91 ex VAT) on release in August*

Contact *Proxim UK 01235 865001*
www.proxim.com

Good Points *The better installation procedure of the two systems tested here, adjustable antenna saves you having to shift your PC to optimise reception*

Bad Points *None to speak of*

Conclusion *Easy to install with a comprehensive manual*

★★

Diamond Homefree

Price *ISA/PCI £89 (£75.74 ex VAT), PC Card £109 (£92.77 ex VAT)*

Contact *Diamond 0118 944 4400*
www.diamondmm.com

Good Points *Slightly cheaper than the Proxim alternative*

Bad Points *We had difficulty getting the Internet sharing to work*

Conclusion *If you can make it share modems, then this is definitely worth consideration*

Sound System DMX vs Montego II Quadzilla

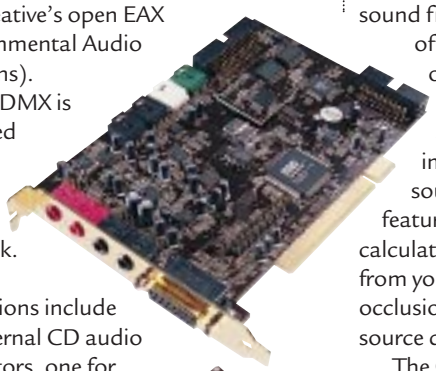
There's plenty to make a noise about with these sound cards – and your CPU will thank you.

If you're keen to boost your PC's performance, a PCI sound card may not be that high on your shopping list. You're probably sorted for sound already, so why upgrade that part of your system? Well, hear this: compared with the ageing ISA, SoundBlaster compatibles, PCI boards operate with significantly less CPU involvement. This frees up overheads, while PCI's greater bandwidth delivers more sound channels, supports 3D positional audio, multiple sets of speakers, real-time effects – the list goes on. Interested?

Terratec Sound System DMX

The Sound System DMX is powered by the new ESS Canyon3D processor and is the first card to use Sensaura's 3D MultiDrive technology. In addition to Sensaura's proprietary 3D algorithms, the DMX is compatible with A3D and Creative's open EAX (Environmental Audio Xtensions).

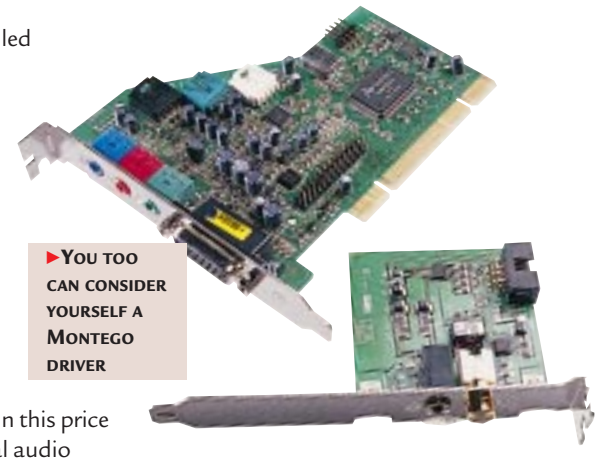
The DMX is equipped for two or four speaker playback. Further I/O options include two internal CD audio connectors, one for voice modem and an auxiliary device of your choice. A WaveTable daughterboard can be added and there's an optional radio module. The second card, which connects internally, provides optical and coaxial digital inputs and outputs.



▲ SORTED FOR SOUND WITH THE TERRATEC

Plug and play handled the installation, so setting up was straightforward. Bundled applications include WaveLab Lite for audio editing, Mixman and 40 shareware titles.

The synthesiser comes with 2Mb and 4Mb sample sets. We were reasonably unimpressed with the quality of the instruments, although this is typical of cards in this price range. However, digital audio playback was crystal clear and virtually no noise could be heard.



▶ YOU TOO CAN CONSIDER YOURSELF A MONTEGO DRIVER

Turtle Beach Montego II Quadzilla

The Quadzilla is built around Aureal's Vortex 2 chipset. As well as providing your everyday meat-and-two-veg sounds, it handles the processing of A3D. Originally developed for NASA flight simulators, A3D creates a stunning 3D sound field using just two speakers. We often found ourselves looking over our shoulder in disbelief.

A3D has support for four speakers and, as expected, this improved the 3D positioning of sounds still further. Other new features include wavetracing (to calculate acoustic reflections, or echoes, from your 3D environment) and occlusion. This filters a sound when its source disappears behind, say, a wall.

The Quadzilla comes with two cards. The main board provides the usual mod cons (mic and line inputs, speaker output and joystick connector), while the second provides connectors for coaxial, digital output and rear speakers. Internally, there are connectors for CD audio, voice modem and an auxiliary device.

We reckon the days of complicated sound card installations are behind us now; plug and play took care of everything first time around. The package includes a suite of audio apps from Voyetra for recording, editing and playing back audio and MIDI files.

Sound quality is exceptional. The onboard synth is rather ordinary, but this shouldn't distract you if you're after a games card, as most sound tracks are on CD these days.

Which is best?

In our opinion, A3D has the edge over Sensaura with the release of version 2.0 hardware and software. However, the DMX package provides digital I/O. The choice, as they say, is yours.

STEVEN HELSTRIP

PCW DETAILS

★★★★

TERRATEC SOUND SYSTEM DMX

Price *£129 (£110 ex VAT)*

Contact *Terratec ProMedia 01600 772111*

www.terratec.co.uk

Good Points *Optical and coaxial digital I/O as standard*

Bad Points *Mixer graphics don't display correctly at a screen resolution of 1280x1024*

Conclusion *A solid all-round performer. Worth the outlay for the digital I/O alone*

★★★★

TURTLE BEACH MONTEGO II QUADZILLA

Price *£99 (£84 ex VAT)*

Contact *Et Cetera Distribution 01706 228039*

www.etcetera.co.uk

Good Points *A3D 2.0 works superbly, healthy software bundle*

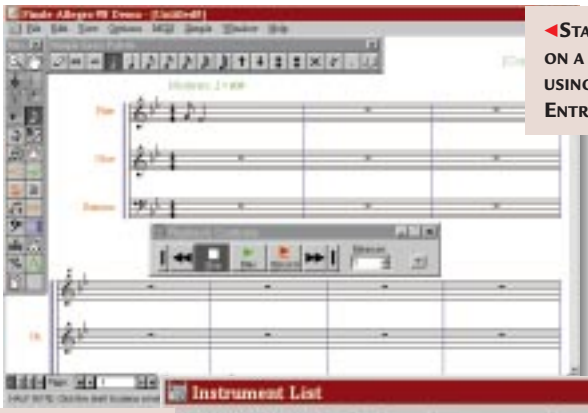
Bad Points *No digital input. Digital output is fixed to either 32 or 48KHz*

Conclusion *The better gaming card*

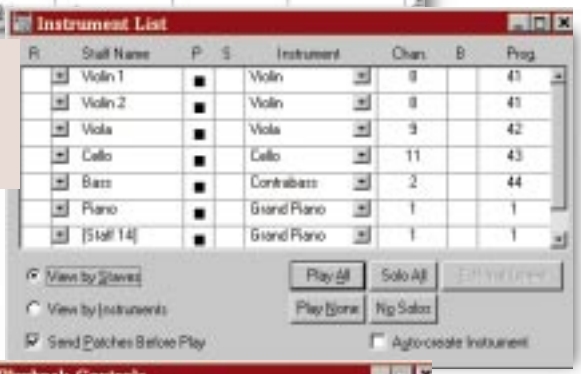
Coda FinaleAllegro

Tune in, turn on and MIDI out to music software that will notate your wildest ramblings.

Score writing applications have never enjoyed widespread popularity. For conventional musicians, the term 'computer music' still has negative connotations and they're rejected by desktop musicians because of their use of standard notation. Indeed, one of the attractions of computer sequencing has been its way of shielding users from music theory and presenting information in a much more accessible form. Notation packages such as this are aimed at the group of people willing to embrace both the crotchet and the computer.



◀STARTING WORK ON A NEW SCORE USING THE SIMPLE ENTRY TOOLS



▶ASSIGNING THE INSTRUMENTS OF A COMPOSITION TO THEIR RESPECTIVE MIDI CHANNELS

▲DEFINING THE PARAMETERS OF THE PLAYBACK CONTROLS

Allegro is score writing for those prepared to sacrifice the advanced features of more sophisticated packages such as its parent application, Finale, to achieve faster results. The designers have gone to some lengths to keep it accessible, stripping away Finale's more esoteric functions such as multiple font printing and its plug-in capability (a major advance for a score writing application). What hasn't been affected is the relationship with MIDI. Crucially, the company has recognised that for many users, a printed score is unlikely to be the final destination of their work.

MIDI is core to Allegro's operations, giving it a more expansive feel than its rivals. You'll find MIDI solutions to a variety of performance-related problems that couldn't be accommodated using scoring techniques alone.Needless to say, you can enter music via MIDI keyboard and standard MIDI files, as well as through the computer's own keyboard and mouse.

There are two step-time note entry methods. Simple entry is designed for basic editing using an on-screen palette of tools, and offers a useful command for checking the notes you've inserted against the time signature to ensure you have only the requisite number.

By contrast, speedy entry is designed to be used in conjunction with a MIDI keyboard to provide a fast and efficient method of entering notes using the computer's own numeric keypad and various key commands. Without a manual for referral, it takes a bit of getting used to (one wonders why the more easily labelled F-keys couldn't have been used), but it does offer a quicker way of working, particularly with the Mass Mover function, which makes it easy to copy and move around large chunks of music.

For those only satisfied with real-time note entry, Allegro also includes Hyperscribe, an impressive feature designed to translate 'live' performances instantly into written scores. Users provide their own metronome 'pulse' which the application will follow, irrespective of any fluctuations in tempo. You can input metronome tempo data by tapping a note on a footswitch, MIDI keyboard or other MIDI device, then leave it to Hyperscribe to place the notes and rests of your performance in relation to it. There's something quite fascinating about watching your performance appear in front of you as a written score, and Allegro does a good job of interpreting your intentions and correcting minor mistakes.

Also included are 38 score templates covering most types of composition: choral, guitar, piano/vocal duet – all the way up to full orchestral works. There's also a series of tutorial videos, although learning to use Allegro is straightforward, provided you're musically literate – and it's hard to imagine a program like this being of interest to anyone who's not.

NIGEL LORD

PCW DETAILS

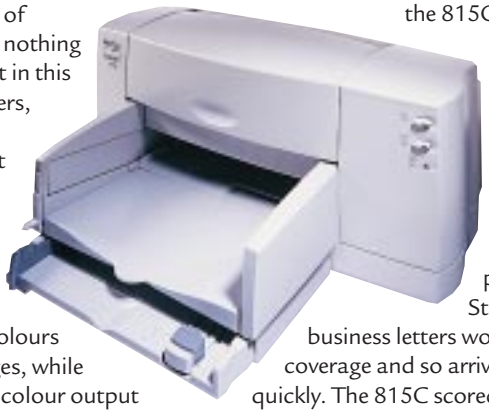
★★★

Price *£179 (£152.50 ex VAT)*
Contact *Et Cetera 01706 228039*
www.codamusic.com
Good Points *Fast and easy to use, whether you're printing scores or playing them through a MIDI system*
Bad Points *A little expensive, particularly when compared to sequencers, many of which include their own score writing facilities*
Conclusion *A relatively pain-free introduction to computer music – if you know the score*

HP DeskJet 815C

Lie back and bask in glorious technicolour because it looks as though HP has done it again.

A top resolution of 600x600dpi is nothing to shout about in this age of megapixel printers, but two bits of HP technology – PhotoREt and ColorSmart – make this sort of statistic redundant. PhotoREt uses photo cartridges to provide more detailed pastel colours for photo quality images, while ColorSmart optimises colour output and enhances the colour clarity of low-resolution images, such as those from the Internet, by bringing them into focus. These paid off, and the 815C produced stunning photo quality output with vibrant colours and realistic skin tones, which are traditionally difficult to produce. There was no evidence of any banding.



Text output was also excellent, and the 815C churned out full pages of 12pt text in 'normal' quality at a rate of around three pages per minute. Standard business letters would have less coverage and so arrive more quickly. The 815C scored an impressive 81.41% in our quality performance tests. Areas of solid black had uniform coverage and regular photocopier paper did not suffer from excessive rippling or curling. The printer has a standard 2Mb of RAM installed, plus eight resident fonts, as well as input and output trays for 100 and 50 pages respectively. HP has supplemented the standard parallel connection with a USB port, while retaining basic compatibility with Windows 3.1 and even DOS, although you'll have to stick with the parallel option here.

In all, this is another impressive printer from Hewlett Packard, and one that proves that higher resolutions are not the be-all and end-all of photo quality printing.

NIK RAWLINSON

PCW DETAILS

★★★★

Price *£179 (£152.50 ex VAT)*
Contact *Hewlett Packard 0990 474747*
www.hp.com
Good Points *USB, fast, excellent photo output*
Bad Points *Can reproduce small fonts, but there are others on the market that can go smaller*
Conclusion *An impressive addition to the HP stable*

Infra-red for desktops

They say that the best things in life are free – wire-free.

Want a bargain PC upgrade? We've just transformed a PC by fitting it with 4Mb infra-red for just £10! Sure, forthcoming radio technologies like Bluetooth don't worry about line of sight and multiple devices, but what about today's products? Almost all notebooks and PDAs are fitted with IR, as are several digital cameras and mobile phones, but no desktop PCs. This is frustrating, because IR easily solves the eternal problem of transferring information between desktop PCs and notebooks.

You can buy external 115Kbit/sec serial-IR adaptors for around £100, but surprisingly, most desktop PC motherboards feature a neglected five-pin jumper labelled IrDA. After much trawling, we ordered an Asus Pent II 440LX/BX IrDA module on the Dabs Direct website. The next day we received a tiny board featuring a pair of LEDs and a cable, but no manual. We connected it

to an Asus P2B motherboard, set 'UART2 to use IR' in the BIOS, started Windows 98 and leapt for joy when the OS recognised a plug and play infra-red port and self-installed the drivers; even Windows 2000 Beta 3 recognised it.

Now we no longer use a cable to connect notebooks, Psion 5 or Sony DSC-F1 digital cameras to this PC – they transfer data at up to 115Kbit/sec. No wires, no software – it just works.

Okay, the motherboard hails from Asus, which also makes the module, but many other boards, including older Socket-7 models, feature the same five-pin IR connector. Believe us, it's the best tenner you'll ever spend.

GORDON LAING

PCW DETAILS

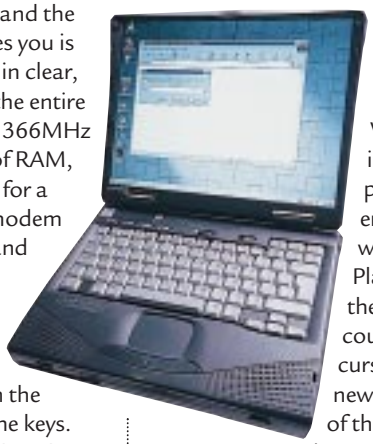
★★★★★

Price *£11.75 (£10 ex VAT)*
Contact *Dabs Direct 0870 129 3000*
www.hp.com
Good Points *Desktop IR for only a tenner*
Bad Points *Your motherboard may not support it*
Conclusion *Best upgrade we've ever made*

Compaq Armada 1750

An impressive-sounding notebook that doesn't live up to its specifications.

Open up the Armada and the first thing that strikes you is the screen. The 14.1in clear, crisp TFT display fills almost the entire inside of the lid. Add to this a 366MHz Pentium II processor, 64Mb of RAM, a 6.4Gb hard drive and room for a 24x CD-ROM, floppy drive, modem and battery in the main unit and you have, at least on paper, a very formidable notebook. The reality, sadly, does not quite deliver.



The first gripe we had with the Armada was the location of the keys. Windows NT was preloaded, but the unconventional placing of the Function and Delete keys meant that it was at least five minutes before we could find the Ctrl+Alt+Delete combination to log on. We also found the keyboard on the Armada slightly too springy resulting in a rather strange sensation after a short period of typing, although this is more a matter of personal preference.

Once into Windows, the integrated touch pad was at best erratic and at worst unreliable. Placing a finger on the touch pad could cause the cursor to jump to a new, unspecified part of the screen. Tapping it would result in a random selection from one of left click, click and hold, and double click.

The inclusion of a CD-ROM, floppy drive and battery made the unit quite heavy, and it definitely seemed too bulky for the flimsy extendable feet on the bottom of the case.

Plus points for the Armada were the addition of a USB port, a standard composite TV out socket, good speakers and an integrated mains power supply.

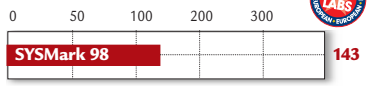
WILL HEAD

PCW DETAILS

★★

Price *£2,149.08 (£1,829 ex VAT)*
Contact *Compaq 0845 270 4000*
www.compaq.co.uk
Good Points *Large clear screen. Room for battery, CD-ROM and floppy drive in the main unit*
Bad Points *Inaccurate touch pad. Overly springy keyboard*
Conclusion *A well specified machine let down by poor build quality and a lack of attention to detail*

PERFORMANCE RESULTS

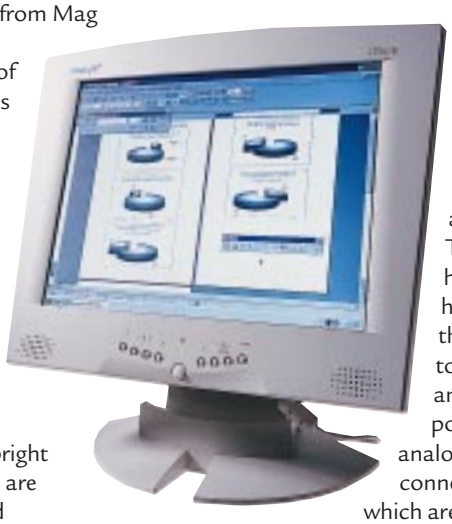


BAPCo Sysmark Windows 95 test scores

Mag LT561E TFT

A multimedia monitor which looks stylish but at the expense of the display.

This new 15in TFT from Mag certainly looks stylish. The sides of the casing slope outwards slightly in a departure from the usual white box approach. However, this does play the unfortunate visual trick of making the sides of the panel appear crooked. The display is generally good, and apart from a couple of small dark patches in the right-hand corners, it is bright and crisp. No dead pixels are visible. The display coped impressively with Half-Life, keeping up with the complex textures. On the bad side, colours are not displayed uniformly, appearing brighter at the base and generally looking washed out.



Mag is hoping to sell this monitor on the back of its multimedia ability, although this is hardly unusual anymore. There's a handy USB hub located at the rear, together with an audio-in port and the analog D-SUB connection, all of which are easily accessible. The sound from the monitor is fairly tinny, as you might expect from speakers of such a small size, although it is possible to get quite a high volume from them without any audible distortion.

The OSD is user-friendly, with the buttons arranged to fit in with the general design. Two dedicated buttons allow you to turn the volume up and down with one touch. The menu system is easy to navigate, with all the usual options available. An auto adjustment program will set the various clock phase and colour settings for you, although to achieve the best results you would be advised to fiddle.

JASON JENKINS

PCW DETAILS

★★★

Price *£904.75 (£770 ex VAT)*
Contact *Mag 0118 975 2445*
www.magtechnology.co.uk
Good Points *Multimedia capability, powered USB hub*
Bad Points *Display could be better*
Conclusion *A respectable all rounder but nothing particularly special*

Mediator 5 Pro Edition

Get yourself noticed and turn a few heads with this neat little presentation package.

Presentation software has moved on somewhat since the birth of applications such as PowerPoint. This particular example allows you to combine the use of photography, film and video, music and sound, and of course, text. Mediator 5 is the latest version of this award-winning multimedia presentation package.

As applications go, this one is relatively easy to use, especially considering what you can do with it. However, despite this apparent ease, it may still require a fair bit of getting used to. For those who are unfamiliar with the previous Mediator, it would be worth using the video tutor to show you the three main steps you'll need to know for all documents. After this, it is recommended that you go through the supplied manual and follow all the examples therein. There is also a wizard option to help you create different types of template for your projects. These range from photo albums to video sequences.

▲ YOU CAN APPLY PHOTOSHOP-TYPE EFFECTS AS WELL AS ANIMATE ANY OBJECT

The user interface is set out like your word processor, with the main menu at the top of the screen and the toolbar down the left-hand side, immediately accessible and clear as to what they are. You can also choose to keep certain dialogs open while you work, such as your Page List or Object List. This makes it easier to keep track of what you're doing and how much you have done.

This edition contains lots of new features which help you add a professional look to your finished projects, while making it all the more interesting to work with. You can experiment with PhotoShop-type effects, such as adding a glow or shadow effect to an object, or use the alpha channel to add transparency. There is also the opportunity to create 3D images by adding a 'Bumpmap' on top of an object to apply this effect.

You can either start from scratch or use the predefined templates/projects. Additionally, you aren't confined to the supplied pictures, videos or sounds, as you can use your own files and add material.

By assigning hotspots and hypertext within your main pictures, you can also make your presentations interactive. For example, by giving the appropriate instructions, you can tell Mediator to display text, go to another page, or play a sound. This drag and drop process does take quite some time, however, and you have to repeat the whole procedure wherever you want to apply it, rather than simply copying it over. At times, the supplied manual, which is otherwise very helpful, gets a bit ahead of itself and leaves you struggling to see where it went. You may have to refer back to earlier examples just to keep up, which becomes quite irritating.

The potential level of interactivity that you can include may seem daunting and unattainable at first. Once you've got the hang of it, though, it shouldn't take too long to complete the lengthy procedures, so any frustration may ease. Once you see your finished page or project in action, you will see how easy it is to create a good presentation.

Other bonuses make up for any shortfalls. Mediator 5 comes with an extra utility, MatchWare Screencorder, which lets you record whatever is happening on the screen. This is ideal for training purposes and demonstrating how to use other types of software, and is what the manufacturers have used in the Mediator 5 video tutorials.

The package would prove ideal for teachers as you can create educational presentations, which allow pupils to interact with the subject and see where they may be right or wrong. One of the exercises in the manual provides a good example of this. Additionally, you can distribute the presentation to a number of computers without having to install Mediator 5 on each of them. You can email it, burn it to CD-ROM or save it to a floppy disk.

HELEN FORTGANG

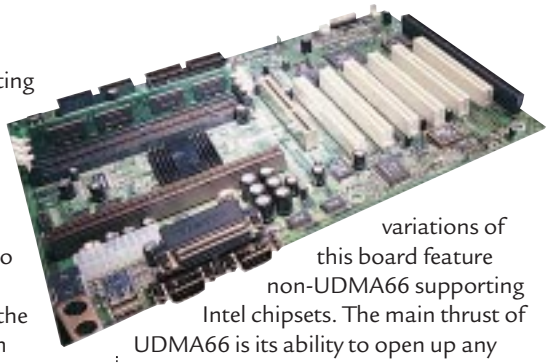
PCW DETAILS

★★★★

Price *£292.58 (£249 ex VAT)*
Contact *MatchWare 0181 940 9700*
www.matchware.net
Good Points *Professional effects. Broad range of media. Reasonable price*
Bad Points *Time consuming procedures*
Conclusion *A versatile and extensive package, Mediator 5 allows the user to create original and engaging presentations. It is ideal for personal use as well as a business and/or learning environment*
System Requirements *Windows 95/98, or Windows NT 4.0; 486 processor; 16 Mb of RAM; 256 colours; true fonts; CD-ROM drive*

TMC TI6VG4 motherboard

The mother of motherboards lets you avoid data rush-hours.



Long before the CPU manufacturers start touting host frequencies of 133MHz, we will be seeing both supporting motherboards and PC133 memory. So we took full advantage of the opportunity to test TMC's TI6NBFV+ motherboard while overriding the Slot 1 setting auto-detect. With the opening of one jumper, tentatively titled Host Frequency Force Selector, a Pentium II was running on a front side bus frequency of 133MHz.

VIA's Apollo Pro Plus provides the PC133 support. The final release of this board will also take advantage of the chipset's AGP4x support, although this was not available in this early build.

In addition there are six PCI slots, including one shared with an ISA for those legacy cards, and an option for up to 64Mb of on-board SDRAM in addition to three DIMM sockets.

Support for the new EIDE interface protocol UDMA66 is currently only available courtesy of VIA's chipset. Two variations of this board feature non-UDMA66 supporting Intel chipsets. The main thrust of UDMA66 is its ability to open up any potential bottlenecks on data transfers between devices such as hard disks and the PCI bus.

Specifically testing potential PC133 performance, we ran our performance benchmarks with 128Mb of PC133 memory and the more modest PC100 memory on a reduced host frequency.

The results returned showed unremarkable increases in performance, although our benchtests are designed to measure overall system performances rather than particularly memory hungry applications that would enjoy the increased data transfer rate of a higher host clock frequency.

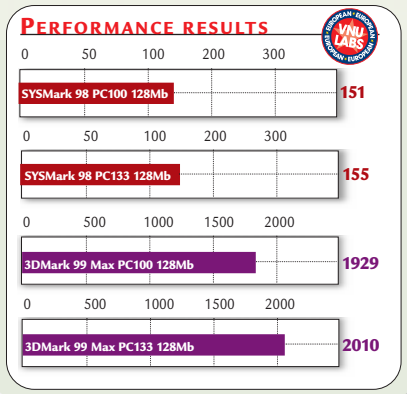
IAN ROBSON

PCW DETAILS

★★★★★

Price *£69.35 (£59 ex VAT)*
Contact *TMC Technology (UK) Co Ltd 01438 842305*
www.tmc-uk.com
Good Points *PC133, UDMA66, AGP4x and Pentium III support*
Bad Points *Currently available without fully supporting processors*
Conclusion *With PC133 SDRAM pricing likely to be equal to that of PC100 this board provides a far cheaper solution than that of Direct RAMBUS. The enhanced features support at this price adds to the argument for more third party chipset solution providers*

PERFORMANCE RESULTS



Elsa Microlink Office

The little white box that does just about everything – if you can get it to work.

The Microlink Office from Elsa claims to be a complete multimedia solution for individuals and small businesses. It is an external modem which also serves as a fax and answering machine.

The modem's firmware uses Rockwell's K56Flex standard, which can be flash upgraded to V.90. The Microlink has 2Mb of memory which can store up to 70 fax pages or 15 voice messages. Unfortunately, the memory cannot be upgraded. The speakerphone can be used to hold a hands-free conversation although you do need a conventional handset to dial out first.

The Microlink Office provides access to the messages from a remote location. Unauthorised access can be controlled using a personal identification number. You can even program the modem to send an automatic reply to incoming messages. However, the Microlink Office cannot be configured to transfer the messages to a remote PC. Like most external modems, this one has a set of LEDs at the front which display its status and can be helpful with troubleshooting.

Despite Elsa's claims of the product being plug and play compatible, we had trouble installing it. The tweaking involved in getting it up and running could be well beyond novice PC users.

AJITH RAM

PCW DETAILS

★★★

Price *£119.14 (£139.99 inc VAT)*
Contact *Elsa 01844 261872*
www.elsa.com
Good Points *Useful manual, answering machine, fax, speakerphone*
Bad Points *Troublesome installation, average download speeds*
Conclusion *A device which does not quite match up to its competitors in terms of performance, features and price*

Visual Web editing *vs* hand-rolled HTML

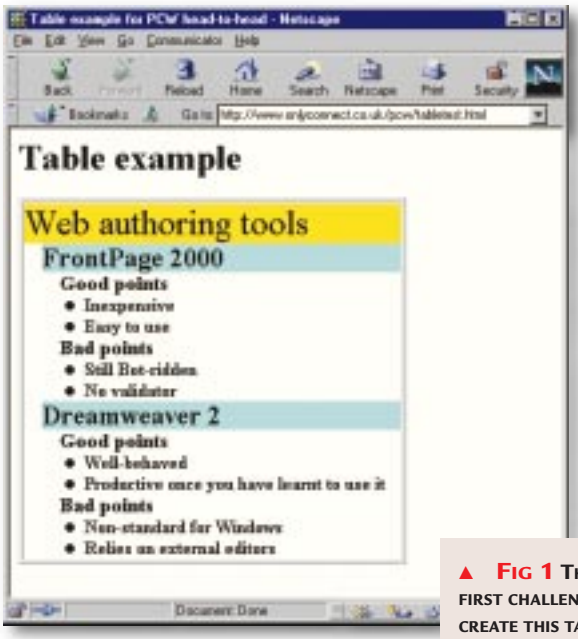
What is the best way to write Web pages? Diehard hand-coders joke about using Visual Notepad, although in fact, they are more likely to use a programmer's tool such as CodeWright or a dedicated Web editor such as Homesite. At the other extreme are page designers who never want to see a line of HTML in the raw. This is where we go head-to-head with the two methods.

The contenders

CodeWright – an all-purpose programmers' editor

Hand-coders who want a great programmers' editor need look no further than Premia's CodeWright. This general-purpose tool can be used for Java, C++, Delphi, scripting, or anything else you care to name as long as it involves writing code. It still includes features such as colour-coding, smart indentation and the auto-completion of keywords.

There are also some useful extras such as multiple clipboards and a built-in clipboard viewer, global bookmarks that allow you to instantly recall any document, quick display of the differences between two versions of the same document, and macros in Perl or Basic. Through a selective display feature, you can make CodeWright a folding editor, hiding most of the document while you work on a small part of it. The package is hugely flexible, copes easily with very large documents, understands UNIX line endings and is generally difficult to do without once you get to know it.



▲ **Fig 1** The first challenge: create this table

Although it is not specifically designed for HTML, CodeWright has some handy features for Web authoring. The HTML toolbar is a quick way to enter common elements, and there is a dialog for parameter completion. Many tags are also available from a right-click pop-up menu. You can also display a browser window that updates instantly whenever you save the code.

Dreamweaver – the totally visual approach

Macromedia's Dreamweaver is a visual page editor that has won friends by avoiding the evil habits of the species (see panel below). It creates efficient code and does not modify existing code or scripts. Dreamweaver is a Macintosh-style application with lots of floating windows. These include the editor, a library, a template and style manager, a site management window, an object palette or toolbox, a property inspector that allows you to modify the currently selected object, a behaviour inspector for attaching JavaScript to objects, and a timeline inspector for building animation sequences. Dreamweaver is well tuned to dynamic HTML and cascading style sheets. It's harder for newcomers to learn than the likes of FrontPage, because it does not have the look and feel of a word processor. One problem is that the built-in HTML and script editors are little better than Notepad, but to be fair, Homesite 4.0 is bundled as part of the package and an external editor button takes you straight to it.

Round 1: creating a table

The first task we tackled was creating a table. We wanted a bold, clear table with sub-headings and bullet points [Fig 1] but this was not quite as easy as it looked. In theory, you should use cascading style sheets, but not every browser supports them and it is hard to achieve consistent results.

The other option is to use a standard HTML table to obtain indented text. We wanted a border around the table but not around each individual cell. However, you cannot turn off the cell borders easily, so the best approach is to nest a borderless table within a single-cell

Three evil habits

Visual Web editors are prone to three evil habits. The first is proprietary tags. Users who export Powerpoint slides or create exotic effects in FrontPage, without realising that someone using Netscape on Linux will not receive anything resembling the intended results, have been caught by the proprietary tag trap. The best protection, aside from a good knowledge of HTML, is reliable validation.

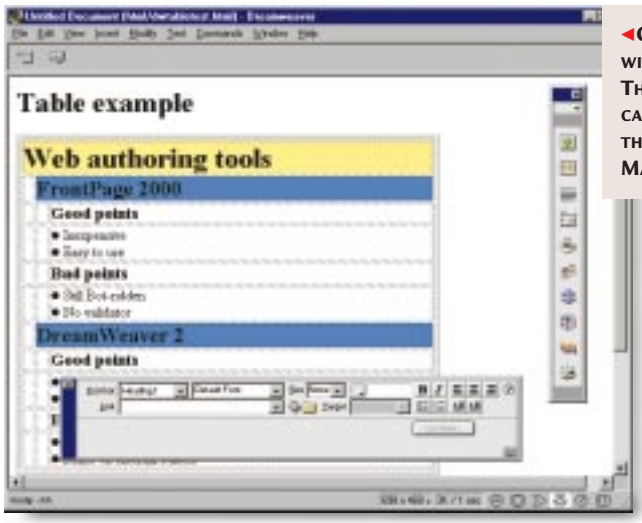
Next comes auto-changing code. No one likes editors that helpfully reformat pre-existing HTML or script, breaking it in the process. Early versions of FrontPage were notorious for this, although version 2000 is a great improvement.

The third evil is code-bloat. Some visual editors are seemingly incapable of creating a document without inserting reams of unnecessary tags, making them slow to download and hard to fix. Again, the main offenders are improving, although if you try to create Web pages from applications such as Microsoft Publisher, you will soon run into this one.

What you see is what you get – sometimes

Some people foam at the mouth and flail their arms at talk of WYSIWYG Web editors. The reason is that the concept strictly does not apply to Web pages. Part of the HTML concept is that the browser, as customised by the user, determines the look of a page. For instance, images might be on or off, the text size is variable and the size of the browser window is unpredictable. There are also tags such as <EM>, meaning emphasised, that do not specify an implementation. Most browsers render it as bold, but in theory it could be double-underlined, in red, or a louder voice in a speech reader. No Web editor is really WYSIWYG.

Less sensitive types appreciate that many of the features of WYSIWYG can be implemented in Web browsers. If your Web editor shows a fair impression of how a page might look when rendered in a browser, as opposed to showing lots of plain text and angle brackets, then it is in the spirit of WYSIWYG. It might be safer to talk about visual editors, though, in case you meet the guy with the foaming mouth. If you really want WYSIWYG on the Web, look at Adobe PDF (Portable Document Format) and the Acrobat viewer, a cross-platform solution that preserves the exact appearance of a page.



◀CREATING A TABLE WITH DREAMWEAVER. THE FLOATING WINDOWS CAN MOVE ANYWHERE ON THE DESKTOP, IN TRUE MACINTOSH STYLE

bordered table. Another problem is that if you use standard HTML paragraph styles for a bulleted list, such as <ul> and <li>, it is impossible to control the line spacing satisfactorily. To resolve this, we used a .gif image for the bullet and avoided paragraph styles.

We did this first in CodeWright. It is surprisingly easy to lay out a table in code, even one with a few merged cells, since there are very few tags to worry about: just <table>, <tr> and <td>. It does help to sketch out what you want beforehand, even using old-fashioned pencil and paper. Once we had done this, it all worked exactly as expected. Nesting a table is a doddle – you just create the inner table and then surround it with the opening and closing tags for the outer table. Changing your mind about the width of the empty cells is tiresome, though, because each cell has to be edited individually. With a graphical editor, you can just drag the width of the column or select a column and edit a property.

CodeWright was good, but creating the same table in Dreamweaver was even easier. The generated code was virtually the same and the task was handled more quickly. We tried to avoid nesting the tables by giving the table a border and setting the border colour attribute of individual cells to an invisible white. Then we ran Dreamweaver's Check Target Browsers, selecting Netscape 4.0. Rightly, it told us that the border colour attribute was not supported.

The real challenge is working out how to get the desired result. For this type of experimentation, we would rather use CodeWright. Using a visual editor such as Dreamweaver, you can have a table looking just right in the designer, but find the spacing is different when previewed in the browser. When you know what you want, though, the visual approach is quicker and easier for tables.

Round 2: a rollover effect

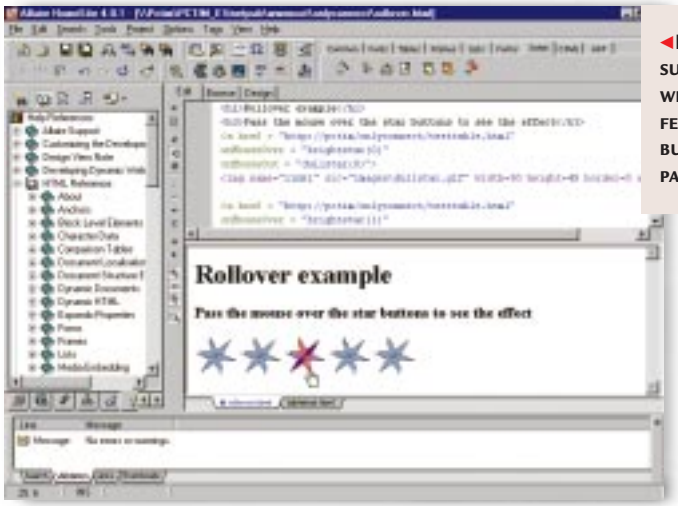
This task was simple enough. We wanted a button whose image changed as the mouse passed over it. To create this you need some JavaScript, but even users of visual editors are in luck because tools such as Dreamweaver and FrontPage 2000 have wizards that will do the job for you. In Dreamweaver, it's a simple matter of choosing Insert Rollover Image and selecting two image files in a dialog. A nice touch is the option to preload images, which inserts some extra code that loads the required images into an array when the page first opens.

Adding scripts in CodeWright is particularly easy since the package does not really distinguish between script and other HTML elements. One annoyance is that by default, CodeWright shows comments in HTML pages in green italics. Unfortunately, it is common practice to place JavaScript functions within comment tags, to help support down-level browsers. Green italics are horrible, so you have to remember to add the comments last, or otherwise tweak CodeWright's parsing to prevent this effect.

When you add an image to a Web page, the width and height should be specified to speed up the rendering of the page. Dedicated Web editors will tell you the size of the graphic, but using CodeWright, you have to look this up using a bitmap editor.

A key point is that in CodeWright, you have to find out how to write the script, whereas in this instance Dreamweaver does it for you. This is the

▶ADDING A ROLLOVER EFFECT WITH CODEWRIGHT. NOTE THE HANDY BROWSER PREVIEW ABOVE THE EDITOR WINDOW, AND THE HTML TOOLBAR AND POP-UP MENU



HOMESITE IS A SUPERB EDITOR WITH EXTRA FEATURES FOR BUILDING WEB PAGES

exception, though, because there are not many script wizards in Dreamweaver.

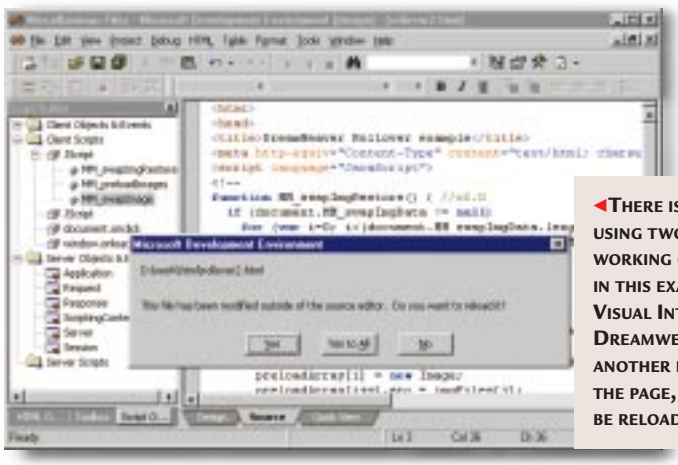
While both tools create the effect easily, there are some differences. Although the functionality is the same, Dreamweaver's page is twice the size of CodeWright's and the script is unnecessarily complex because it is dealing with a general case. That also makes it harder to tweak the code. The hand-coded approach forces you to understand what the script is doing.

CodeWright is better than Dreamweaver for scripting, but to be honest, a dedicated tool such as Microsoft's Visual Interdev which offers pop-up code completion, colour coding, and debugging tools such as a watch window and breakpoints. There is also a script outline window, including a view of the document object model and the ability to insert an instant event handler by double-clicking.

The joker in the pack

Dreamweaver finishes this contest a nose ahead. Its generated code is good, it is faster to work with and the rich HTML-specific features pull it ahead. What clinches it, though, is Homesite 4.0 (see panel below), a programmers' editor designed specifically for HTML. Homesite has most of the advantages of CodeWright, plus a stack of additional features including an integrated validator and rich online HTML reference. Homesite vs Dreamweaver would be an agonising choice, except that the two are bundled together – almost a dream come true.

Whatever choice you make, the most important thing is to use tools that let you work with different editors on the same page without scrambling your code in the process. Dreamweaver, FrontPage 2000 and Visual Interdev are all good, while NetObjects Fusion or earlier versions of FrontPage are problematic.



THERE IS NO PROBLEM USING TWO EDITORS FOR WORKING ON A PAGE, AS IN THIS EXAMPLE USING VISUAL INTERDEV AND DREAMWEAVER. IF ANOTHER EDITOR CHANGES THE PAGE, IT WILL BE RELOADED

Final tips

One of the problems with Web design is that so many skills are involved, including creating content, visual design and programming. Few, if any, are good at every aspect and the same is true of the tools. Here, then, are a few tips:

There is no need to be snooty about using visual editors, which can save a lot of time. But you need to choose your editor carefully. Dreamweaver is excellent, but many visual editors create poor HTML that at worst may not even display properly in your target browsers. The worst case is applications that are really for word processing, DTP or presentation graphics. It is asking a lot to expect top-notch Web pages from such a tool.

Visual editors are useful, but you need to be able to drop easily into HTML to produce excellent Web pages. Using an editor such as Homesite or even CodeWright gives experts a comfortable and fast environment for working with the code and also offers beginners the best opportunities for learning.

If you are expecting to do serious amounts of scripting, use a tool designed for the job.

However you produce your Web pages, use a validator to check the code for errors and incompatibilities.

TIM ANDERSON

Homesite – the dedicated HTML editor

Allaire's Homesite is still essentially a text editor with an array of features to speed up HTML coding. There is even a design view which is close to WYSIWYG, although Allaire insists it is only for prototyping. Most of the time you will be looking at raw HTML code, although there is a myriad of features to speed the editing process. For example, if you right-click and choose Insert Tag, a tag chooser dialog opens, with tags organised in an easily managed tree view. Selecting a tag opens a custom dialog where you can add attributes and content, with guidance on browser-specific elements. The tabbed editor has a browse view for quick preview. Press Shift-F6 and the validator kicks in, listing any errors or warnings in an output window with hyperlinks to the source. This is a great combination of hands-on HTML, with well thought out extras.

PCW DETAILS

Homesite 4.0
Price *£75 (£88.13 inc VAT)*
www.allaire.com
available from System Science
0171 833 1022

CodeWright 6.0
Price *£149.00 (175.08 inc VAT)*
available from System Science
0171 833 1022

Dreamweaver 2.0
Price *£229.00 (£269.08 inc VAT)*
www-euro.macromedia.com
01344 458600

You've got mail!

SETTING UP AN EMAIL SERVER TO PROVIDE AN EXTERNAL CONNECTION VIA THE INTERNET NEEDN'T BE A TIRESOME TASK. NIGEL WHITFIELD SHOWS YOU HOW CAREFUL PLANNING CAN HELP GET THE MESSAGE ACROSS.

Most offices have email of some sort set up on their internal network, and increasingly they have a connection to the Internet. In many cases, however, the two aren't linked. Whatever the internal email system you use, and whatever type of net connection, linking the two together to provide an external email connection via the Internet can be tricky; but a little planning and forethought will make it a simpler and more manageable task. Manageability in particular can be an important issue, especially for a smaller company, where looking after the email is likely to be delegated to someone who might be the network administrator as well as having a full-time role in another department.

Before you look at ways to connect your existing internal email system to the rest of the world, you need to decide if it suits your needs. Does the internal system have quirks and annoying features? Does it regularly fall over and require a lot of administrator attention? If so, this might be a good opportunity to replace it.

If you're using simple workgroup email on Windows PCs, would you benefit from a more sophisticated solution, like Novell GroupWise, which will help manage workflow of documents between users? Or would the central database approach of Lotus Notes make it easier for people in your organisation to access the information they need?

Whatever the decision, now is the time to make it; adding an Internet email link can be, though not necessarily, an expensive thing to do. Buying software that will have to be replaced if you change your mail system will only make things more so.

If you're happy with your internal mail system, a straightforward solution for many people is to simply add on an email 'gateway' service, which will act as a bridge for emails to and from the outside world. But while a gateway will work, it might not be the best choice. The type of gateway software and hardware available will depend on the setup you have already, and the software certainly is unlikely to be easy to move between different hardware systems.

Hardware and software options

While your existing internal email solution may just be implemented in software — perhaps with a shared 'post office' set of directories on a common hard disk — when it comes to linking this to the Internet, you will need a more sophisticated setup. Firstly, if your internal email package doesn't run on a server, it has to rely on individual email programs to place files in appropriate places. With an Internet connection, however, you must have a package that runs on a

Hulton Deutsch/Corbis

server, collecting messages and distributing them to users. The package might also have to convert email from an Internet format to the format used by your internal mail package, so that attachments appear correctly in messages, extra Internet headers are hidden, and so on.

In a small network, or one with excess computing power on some of the PCs, you can very probably run an Internet email service on one of your existing computers. But if your hardware is creaking at the seams, or you want to choose a particular type of software, you might find that the only way to run things reliably is to have another computer dedicated to processing messages. And if you expect that Internet email is going to be important to your business, that's almost certainly a necessity.

Basic connections

At its very simplest, you may be able to get away without spending any money at all on your Internet mail link. If you're using a program like Outlook, or the Windows Messaging Client (called Exchange in earlier versions of Windows 95), you can easily add the Microsoft Internet Mail service to a user's profile, which will allow external mail to be sent and received. If you have an Internet connection that's accessible to all the systems, either via a network and a router, or perhaps using the new connection sharing in Windows 98 Second Edition, then all you need to do is find an Internet service provider that will allow you to collect individual emails from a single POP 3 account.

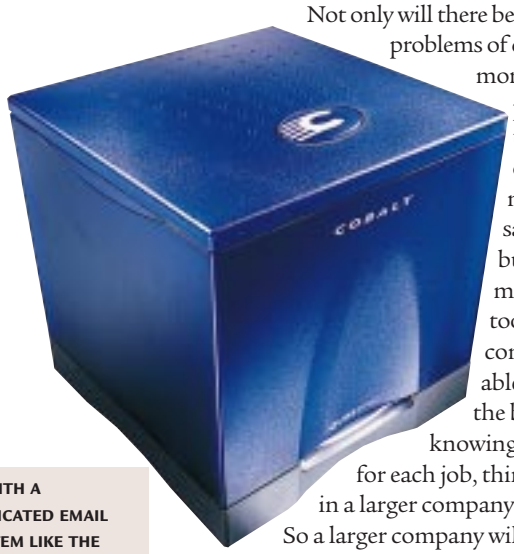
For example, Demon Internet's POP 3 service allows you unlimited email users, and you can retrieve just the messages for a single user in a session by specifying a user name as well as your hostname when you connect. A few simple configuration options on each computer, and hey presto! — individual Internet emails on the desktop, with each person still using the same mail program they were used to.

There are drawbacks to this approach, however. If you're relying on an external ISP, then it's unlikely you'll be able to have multiple users simultaneously accessing the mailbox; and the more users in your office, the greater the likelihood of that happening. And, of course, the main sticking point may be ensuring that each machine has access to the Internet via a shared modem or other connection; adding a router to enable all the systems access could cost anything from £400 to a couple of thousand pounds.

Nevertheless, with a simple router or Windows 98 connection sharing, this can be one of the most cost-effective ways of linking to the rest of the world. For a small office, with little technical expertise, it could also be the simplest and most trouble-free solution: once the email clients have been configured, there's little else to do.

Mid-range system

As we've said, when you have more than a handful of users, things start to become more complicated. Not only will there be potential problems of connection — more than one person wanting to access a common ISP mailbox at the same time — but there are management issues too. While a small company might be able to work on the basis of people knowing who to contact for each job, things are less clear in a larger company with more staff. So a larger company will need a selection of addresses to contact whole teams as well as individuals, for example the sales team or the accounts department, without knowing personal addresses. And the more addresses there are, the greater the likelihood of people wanting a central contact point where they can ask who to mail about a particular issue.



▶ WITH A DEDICATED EMAIL SYSTEM LIKE THE COBALT QUBE, MUCH OF THE CONFIGURATION OF A UNIX EMAIL SERVER CAN BE DONE FROM A WEB BROWSER

Having a 'postmaster' address is mandatory; it's part of the Internet's mail standards, and as a result, it's where many people will send complaints and general queries. And it highlights one of the features that you'll almost certainly need when your mail system grows: aliasing.

You'll have to make hard decisions about HOW YOU WANT TO CONNECT your mail system, and how much you want to spend on it

Aliases are vital if you want to manage mail effectively. They give you control over your own email server, allowing you to add people, like new members of the accounts department, without having to contact your ISP each time a change is needed.

At this point you'll have to make hard decisions about how you want to connect your mail system, and how much you want to spend on it. Do you want to register an Internet domain name for your organisation? And how will you collect your messages? Via an Internet connection, or some other type of dial-up link?

You might have thought that 'Internet email' means you have to use TCP/IP. But you don't need to run the TCP/IP protocol to collect your messages. While this is an obvious option, many people feel that using the protocol can present a security risk too: as long as the TCP/IP connection lasts, your network is potentially vulnerable to malicious attacks.

You can collect messages in other ways instead, like UUCP (Unix-to-Unix Copy Program) or via a connection to a specialised service provider that runs a gateway service for you. This will stop people from directly attacking systems on your network, although viruses in email attachments, such as Melissa, will still reach you.

So what's the main benefit to other types of connection? In many ways, it's simplicity. Installing and configuring TCP/IP, as anyone who's ever set up a network of computers knows, isn't always the most straightforward task, so for less technical administrators, using an alternative system can save a lot of time.

Tight budgets, small hardware

The amount you have available to spend can affect your choice of hardware and software. If you want to run a package like Microsoft Exchange, you'll need a well-featured PC running Windows NT Server, with plenty of memory and disk space. That could set you back over £2000, while NT Server 4 will cost you over £600. You can put Exchange Server on your fileserver, but it will be excruciatingly slow if there's more than a handful of users. For all but the very smallest offices, you'll need a dedicated computer.

For tight budgets, or organisations with limited technical resources, there are 'Internet in a box' solutions, essentially a small computer running an email server and web proxy in a box that comes ready configured. Just plug it in, add a POP 3 mailbox facility to your existing email clients, and you're ready to go.

With more technical expertise you can achieve the same yourself, running either a Windows-based POP3 server — many of which can be downloaded from the Internet — or using Linux or Unix to do the same job. With a dedicated system such as the Cobalt Qube [*pictured, above left*], much of the configuration of a Unix email server can be done from a web browser, without the need to know any Unix commands.

Dedicated servers

While many of the well-known commercial email packages have their own Internet gateway software either available as an option or included in the basic bundle, they're not the only solutions — and very often not the cheapest. For sheer ease of use, a package that's properly integrated with your internal mail system will usually be the best option and the least trouble to maintain. Bear in mind, though, that if you use a client like Outlook, there's no reason why you shouldn't

just use it as an Internet mail system, rather than searching for ways to link your internal system to the world.

If you do want to look around more, as long as your mail system uses one of the common standards, such as MAPI, then you'll be able to find a selection of gateway programs that will link it to other networks, including the Internet.

For example, the TFS gateway software supports several different email systems, and will connect to a service provider via UUCP rather than TCP/IP; it will also run on a fairly low-powered PC, albeit quite slowly.

▶THE INTEL EXPRESS 8100 ISDN ROUTER

In looking at different solutions, there are more things to consider besides compatibility — and it can sometimes be these that will determine which is the best package to use. How, for example, does the gateway handle email addresses? Will it provide 'fuzzy matching' and guess that if someone mails over the Internet to 'nwhitfield' that a message should be delivered to 'Nigel Whitfield' on the internal mail system? Or will it just bounce back an error to the sender?

How easily can aliases be created? And will the system automatically recognise a new user you add to the internal mail system for external mail? Or will you have to add 'set up external mail' to the list of things to do each time you have a new user? Both have their advantages, but if it's ease of use you want, a system that does everything for you, and minimises the amount of misdirected email, will make life much simpler.

Security

All of these are factors to consider when you're choosing your mail system, but there's one that may influence people more than any other now — security. No matter how your PCs connect to the rest of the world for email, whether it's via a dialup link to an ISP's POP3 server, a Unix-based gateway on your LAN, or a UUCP connection to a gateway that links to your Microsoft Mail system, you're still vulnerable to viruses and other malicious attacks that can be sent as email attachments. So for anyone who takes the integrity of their systems seriously, there's one important question that needs to be asked of just about any mail system: Can it be protected against viruses?

The answer is no. With the speed of development of viruses, you're unlikely to be able to offer complete protection — and some speculate that it's the false feeling of safety that caused so many people to fall prey to the latest round, after installing anti-virus software on their email gateways. Even so, it's worth finding an email gateway that can be linked to anti-virus software; most of the major packages can do it, and it will provide some peace of mind. But it's never going to solve the problem. The only way to do that is to make sure the people who are using your email service are properly educated about the possible dangers of attachments. Just say no to executables, Word documents, and anything else that could carry a macro.

If you already have an anti-virus policy, check with the maker of the software you're using to see what email systems it can link to.

▲THE DELL POWEREDGE 6300, POWERED BY AN INTEL XEON SERVER

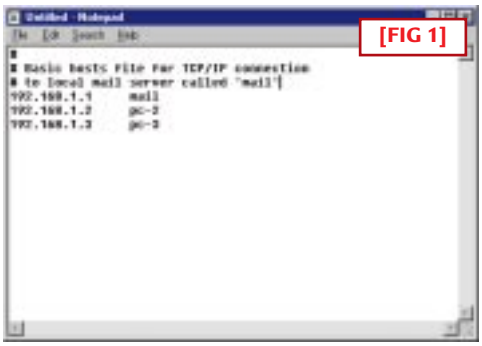
And if you don't have one already, find out what's supported by the email software you want to use.

If you're using a server that talks TCP/IP to the rest of the world, then time spent making sure it's secure is vital; running Microsoft Exchange might seem a simple option, but if your NT server is linked to the rest of the world, even for just a few minutes a day, making sure you have the latest updates to applications like Internet Information Server is essential. Unix systems too are vulnerable, but they seem to fall prey to attacks far less than the more standardised NT and Windows systems. Don't assume, however, that Unix or Linux will solve your problems in this regard: even if an email virus or worm won't affect the mail server itself, it could still pass unscathed to the PCs on your network.

All this might sound like a nightmare — and if you make the wrong decision, it can be. But as our walk-through shows [*over*], it can also be pretty straightforward to configure a basic system to distribute email around your office and to the Internet.

Setting up Internet mail step by step

NTMail is one of the most popular Internet mail systems for Windows NT. It will collect messages via a dialup account as well as a fixed link, and provides features such as aliasing and automatic response 'robots', and plug-ins that can perform functions such as virus checking. You can download a 28-day evaluation version from www.ntmail.co.uk.



Although this workshop is based around NTMail, the steps you'll need to set up TCP/IP addresses and email clients will be similar if you want to share a net connection via Windows 98 or a router that hides your network from the rest of the world.

1 **If you're running NTMail** or another system that provides a POP3 mail service, you'll need to use a POP3 or IMAP4 mail client on each PC — which means installing TCP/IP on all the systems on your network. For a small network with no permanent Internet link, configure the machines with sequential IP addresses from one of the private ranges [see *PCW, September 1999, p110*].

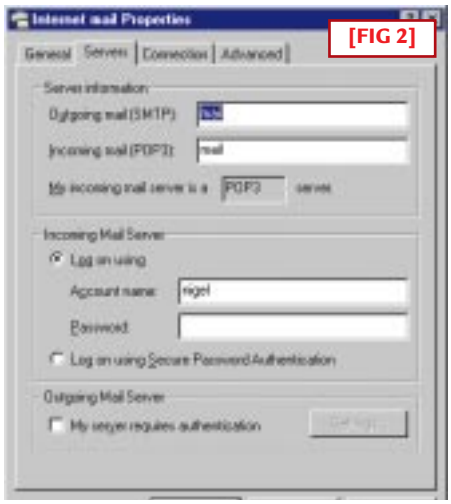
2 **Put a hosts file** in the Windows directory on each system to allow them to resolve names to addresses. Fig 1 is a sample file, created in Notepad and saved as HOSTS with no extension. If you simply want access to the email server, just list that in the file and none of the other systems.

3 **On the client PCs**, using a mail program like Outlook Express, you'll need to configure the name or IP address of the NTMail server for both sending and receiving email. We've called the server simply 'mail' and assigned it the IP address 192.168.1.1. If you're using a service like Demon's POP3, you could specify a particular email name by giving the account name user+hostname.demon.co.uk in Outlook, to collect messages just for 'user'. [Fig 2]

4 **If you're using a Dial-Up Internet connection**, now's the time to configure it. You'll also need to know the details of your account with the ISP that you're using, including the server that you can send all your outgoing email to. This means you can send mail out, then hang up the phone much more quickly.

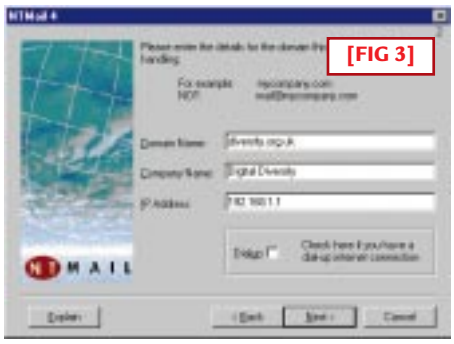
5 **Start the NTMail installation program**. After being asked to agree to the licence, and for a postmaster's password, you'll see this splash screen, where you need to enter the IP address you assigned to your computer's network connection - 192.168.1.1 if you followed our example above. You also have to enter your domain name. Check the box if you're using a dial-up connection to the net. [Fig 3]

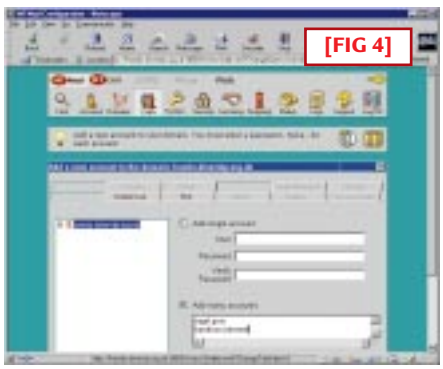
6 **Now you have to enter the details** of your ISP account. Click on Next, then you can specify how often to check for email if you're using a dial-up link. You can also specify whether to use POP3 or SMTP to collect email. POP3 is more common, but SMTP is used by some providers such as Demon and offered by others on request. SMTP is a better option, as it requires less configuration when you add other users. It's also on this page that you'll enter the name of your ISP's outgoing mail server. If you specified POP for collecting mail from the ISP, the next screen will prompt you for details.



7 **Now all the other administration of NTMail** can be done via a web browser from any PC, just by pointing it at port 8001 on the server. You'll need to enter the user name postmaster and the appropriate password.

8 **From the main screen**, click on the Users button and then choose Add. You can add users one at a time, or type a list into the Add Many Users box, separating user name, password and real name by commas, as in our example screen. [Fig 4]





There are plenty more configuration options in NTMail, allowing people to access their messages via the web, or enabling automatic responses. But for basic email between your network and the rest of the world, that's all there is to it. ❐

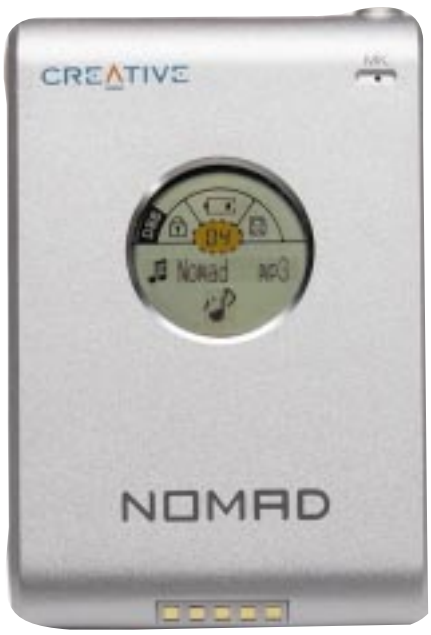
Sound and fury

THE BIG RECORD COMPANIES ARE HITTING SOME SOUR NOTES OVER MP3, THE TECHNOLOGY WHICH ENABLES THE DIGITAL COPYING OF MUSIC OVER THE INTERNET. NIALL MAGENNIS LENDS AN EAR.

For the first time since the explosion of the Internet, 'sex' is no longer the most popular group of three letters searched for on the Web – 'MP3' now claims the top spot. While this might be good news for moral crusaders, it's unlikely to have been greeted with such warmth by the big six record companies – Sony, Bertelsmann, Warner, EMI-Capitol, Universal and PolyGram.

It used to be that if you wanted the latest single without having to pay for it, you listened to the radio with a blank cassette in your tape deck and a finger on the pause button ready for release when the song came on. Record companies didn't mind this all that much. After all, in many countries they were receiving a small royalty from every blank tape sold, and the listening experience was degraded significantly by a moronic DJ speaking over the intro and outro of the song.

▼ BASED AROUND THE INNARDS OF THE YEPP, CREATIVE'S NOMAD COMES WITH EITHER 64MB OR 32MB OF MEMORY, ENOUGH TO STORE TWO HOURS AND ONE HOUR OF MP3 RESPECTIVELY. THE NOMAD ALSO HAS A VOICE DICTATION MODE, SO YOU CAN TAKE VOICE NOTES AS YOU WALK ABOUT



But times have moved on. Nowadays you can simply enter the name of the song or artist into a dedicated search engine such as mp3.lycos.com and a few minutes later you are in possession of a digital copy of the single. This temptation is obviously proving too much for consumers and the big six are not happy.

They're so unhappy, in fact, that they are using the Recording Industry Association of America (RIAA) to try to limit the growth of technology surrounding MP3. This is ironic, as many of these companies contributed research money to fund projects which gave birth to the MP3 standard.

The RIAA now accepts that it is unable to stamp out pirated music download sites which spring up by the hundreds each day. According to Cary Sherman, senior executive vice-president of the RIAA, the association now believes the only viable solution for preventing free downloads is to attack the problem on the receiving end. This resulted in the RIAA's misguided decision to take Diamond Multimedia to court over its Rio MP3 player. Luckily for consumers, this was a battle that the RIAA lost.

'There's a lot of buzz about MP3, but basically it's just a way of compressing audio,' says Scott Law, QuickTime product manager for Apple. 'People have got all excited about it because of the way that it has been adopted. There's a lot of copyrighted material on the Web for people to download and pirate.'

Techno trouble

So just what exactly is this technology that is causing so much controversy? To answer this, we first need to set out how digital audio works. CDs contain audio that has been converted into data by sampling at a rate of 44.1K samples per second using 16 bits per sample. This generates a huge volume of digital information – every minute of audio takes up roughly 10Mb of disk space. While this is fine for use on CDs, it's much too large if you want to distribute music across the Internet. A single song might take hours to download. This is where MP3 comes into play.

As a lossy format, MP3 can compress audio by a factor of 10-12, yet still maintain audio quality

that is hard to distinguish from normal CD sound. It uses a compression method called perceptual coding which takes advantage of weaknesses in the way the human ear perceives sound waves. It basically looks for audio information that the ear won't realise is missing from the signal, and strips out this data.

'There are always musical notes and musical noise in audio playback which is out of your hearing range, so those types of noises get removed,' says David Shickel, technical director of Real Networks. 'It's fairly generic for most encoding types to be able to do that.'

It's surprising that such an old standard has suddenly gained this huge notoriety. The MP3 compression scheme was actually invented in 1991 by a German research firm, the Fraunhofer Institute. Despite there being a whole raft of competing compression schemes from commercial companies with large marketing budgets, MP3 has managed to become the most popular. This is partly due to the excellent audio quality. According to Shickel, it is very difficult to tell the difference between the audio quality offered by the competing compression schemes.

But there are other reasons. Many of the early MP3 encoding and decoding programs were created by amateur coders and given away free on the Internet. Because the software was available for free, it was picked up by students. Many of the early pirate MP3 sites were student Web pages or FTP sites hosted on fast university servers with high bandwidth pipes to the Internet.

Scene and heard

The MP3 scene gradually spread across the Web, so that at any one time there are thousands of copyright songs stored on Websites or FTP servers. 'The RIAA in the US and the Performing Rights Society in the UK are worried about what's happening here. And of course the record companies are clearly looking at their revenues,' says Shickel. 'Arguably I could encode my whole CD collection, put it up on the Web, and you could download the whole thing and put it onto your Diamond Rio player – and guess what, you'd never have to buy their products.'

The spread of MP3 took people within both the software and the record industries by surprise. In many ways, the record companies could be blamed for not being quick enough off the mark with digital distribution, but the fact remains that MP3 distribution is illegal and damaging for many of the artists whose work is being copied.

'The MP3 market is interesting and there's a lot of demand out there for MP3 music, but currently it doesn't allow record producers to derive any revenue from it, so at the moment it's just a technology that allows for piracy of music,' says Neil Laver, Internet product manager at Microsoft. 'Ultimately, in the long term, that's in nobody's interest.'

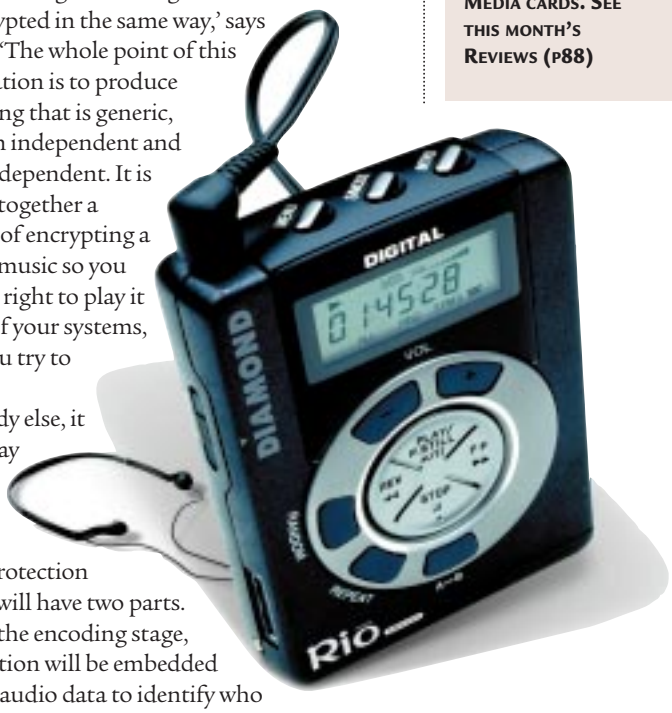
▶ MP3.LYCOS.COM WILL FIND TRACKS FROM YOUR FAVOURITE ARTISTS OR ELSE YOU CAN CHOOSE A SONG TITLE TO SEARCH FOR

Protection scheme

With the RIAA having failed to stop the Diamond Rio from appearing on the market, the music industry needs a new type of technology for protecting digitally encoded music so that digital audio cannot be played back by anyone other than the original purchaser. As a result, it has teamed up with software companies such as Real Networks, Apple and Microsoft to produce a digital copy protection scheme. The group goes by the title Secure Digital Music Initiative (SDMI) and the plan is to develop a protection scheme that will work across a wide range of different compression formats.

'MP3 is here to stay, so SDMI is looking at ways of bolting something on to MP3 files so that it's encrypted in the same way,' says Shickel. 'The whole point of this organisation is to produce something that is generic, platform independent and codec independent. It is putting together a method of encrypting a piece of music so you have the right to play it on any of your systems, but if you try to give it to somebody else, it won't play on their system.'

The SDMI protection scheme will have two parts. First, at the encoding stage, information will be embedded into the audio data to identify who



▼ DIAMOND RIO PMP300: THE RIO WAS THE FIRST MP3 PLAYER TO BE AVAILABLE IN THE UK AND WAS AN INSTANT HIT. NOW IT HAS BEEN UPDATED WITH A MEMORY UPGRADE FROM 32MB TO 64MB, WHICH IS UPGRADABLE TO 96MB VIA REMOVABLE FLASH MEDIA CARDS. SEE THIS MONTH'S REVIEWS (P88)

THE AMATEUR MUSICIANS' VIEW

Benjamin Ackerman plays in an indie rock band called xSpace. The band has posted its music on its website in MP3 format. 'Before we used MP3, we had some short wav file samples on our page, but they were huge in size and too short a clip to be worth a download,' he says. 'By putting our MP3s online, we would be giving people access to the entire song in CD quality and hopefully gaining fans based solely on the quality of the music – the way it's supposed to be.'

Skot McDonald is one half of Australian electronic duo Vellocet. The band also posts songs on its Website. 'We're mainly an electronic/studio band, so MP3 was a practical way of getting stuff that is hard to perform live out to an audience, especially when just starting out,' he says. So is he worried about MP3 files ruining his chances of making a career from music? 'No, because MP3 distorts your music,' he says. 'Anyone who really appreciates the music would have to buy it in a linearly encoded, non-lossy format – CD – to hear it properly. 'Anyway, economies and industries in the developed world are moving towards service rather than product provision, so maybe the future is music service providers paying bands to produce music for free distribution, with the providers making money from advertising, concerts and the like.'

xSpace
www.cosnet.com/xspace/mp3.asp

Vellocet
vellocet.ii.net

▲ SAMSUNG YEPP: THE SAME SIZE AS A CREDIT CARD, SAMSUNG CLAIMS THE YEPP IS THE WORLD'S SMALLEST MP3 PLAYER. IT'S ALSO THE SNAZZIEST, WITH A SILVER OR BLUE FINISH. THE YEPP DOWNLOADS MP3 FILES FROM THE NET INTO ITS 32MB OF MEMORY, WHICH CAN BE EXPANDED USING FLASH MEDIA CARDS, AND ALSO FEATURES A DIGITAL FM TUNER AND VOICE RECORDER

the music has been licensed to. The second part of the equation will involve players, either hardware or software. These will have software code embedded into them that will be able to quiz the embedded information in the audio stream to find out whether the user has actually purchased the music or whether they are trying to use a pirated copy.

'The whole idea is to do the same kind of thing as the way you can get a digital certificate for your Web browsers,' says Shickel. 'The SDMI thing is probably the only non-proprietary thing that's going on.'

The next generation of the MPEG standard will also have provision for the addition of copy protection schemes such as SDMI. 'The MPEG4 systems layer includes all sorts of "hooks" to make it easy to tie in MPEG4 with secure systems, content management systems and rights management systems,' says Rob Koenen, an engineer at KPN Research who sits on the MPEG standards committee. 'MPEG4 will have an interface into which other companies can plug their protection technology. For instance, MPEG has a concept called scene description, which you can hook into. If you encrypt something there, it's very difficult to reconstruct the original material. You'll also be able to hook protection into the individual content streams.'

Despite all these promises of a secure future for record company profits, the reality is that every other digital music protection system in the past has been cracked. Liquid Audio and A2B both claimed that their proprietary music distribution systems were secure, but there is now a program on the Internet called A2b2wav which adds a record button to both company's players, allowing crackers to save the files as standard wav files and then encode them into MP3 files for upload to pirate sites.

It looks like the record companies will have to devise a new business model if they are to make any money on the Web. ❐

PCW CONTACTS

drogo.cselt.stet.it/mpeg
The official MPEG committee Website
www.mpeg.org/MPEG/mp3.html
MPEG pointers and resources
153.96.172.2/amm/techinf/layer3/layer3faq/index.html
An FAQ on MPEG from the Fraunhofer Institute
mp3.lycos.com
An MP3 search engine
mp3.lycos.com/players/windows
A list of MP3 players for download

Illustration by Trevor Dunton

Going going gone

WHAT AM I BID FOR THIS LOVELY PC? A TASTY LITTLE NUMBER? MAKE AN OFFER AT AN ONLINE AUCTION, WITH OUR GUIDE, EIRA HAYWARD.

Are you looking for a good deal on 128Mb of RAM, or that digital camera you've always hankered after at a knock-down price? Then online auctions may be your answer. They're already big business in the US, and are catching on over here.

Currently in the UK there are no more than a dozen active online auction sites, but new ones are launching all the time. Already this year Yahoo UK has started an auction business <auctions.yahoo.co.uk>, as has newspaper group Newsquest <www.auctionhunter.co.uk>. This year has also seen the launch of simultaneous TV and online auctions through The Auction Channel <www.theauctionchannel.co.uk>.

Online auctions have been around for about four years in the US, where the big names include www.eBay.com, www.Egghead.com and www.uBid.com. It seems there is nothing you can't buy at an online auction in the US, from real estate at www.usliquidators.com to fine art, cars or Beanie Babies – they're all available at the click of a mouse.

Online auctions are split into two areas. The first type are person-to-person, where the auctioneer acts as a middleman just like a traditional auction house, never owning what

goes under the hammer. Second, there are business-to-consumer auctions, where the auction house has bought in stock and is selling it off complete with manufacturer's warranty.

It's not always obvious how the sites make any money. Indeed, US analyst Forrester Research finds that many of the US sites are running at a loss. Even the well-established sites are fairly fragile operations – for instance, eBay crashed several times in June for hours at a time and in the process wiped 10 per cent off its share price.

At a traditional auction, both the buyer and the seller are charged a premium, but some of the online sites don't appear to do this. 'Some try to make their money by offering services around the sale, like charges for shipping, insurance and advertising,' says Internet analyst Nick Jones of Jupiter Communications. 'But what they all want you to do is spend a lot of time on the site so they can build up a profile of the kind of consumer you are. It's classic database marketing.'

There have been some rumblings of concern about fraud on online auction sites in the US. eBay, which boasts 250,000 new items on the site each day, is being investigated by federal investigators and the New York City consumer affairs department. Along with the more commonplace stories of sellers not sending what buyers think they have bought, there are more alarming tales of a stolen Kentucky Derby trophy up for sale and a 13-year-old who nearly managed to buy a Ferrari.

There are also different types of auction. Occasionally, sites run a Dutch auction where the lot price drops periodically until the first bidder gets the goods. The lot's opening price and the auction's time of close are set, and then it's just a question of holding your nerve – the first bid wins the auction. Reserve auctions are extremely common. This is where lots have a reserve price – the lowest price at which they can be sold – so if you thought that an auction might be an ideal opportunity to pick up a PC for a couple of quid, think again.

We spoke to one auction addict who hates to go shopping, but who loves the fact that he can bargain-hunt from his PC. His chief criticism was that there is much the auction houses could do to make the online experience more interactive and exciting. Some of them don't automatically let you know when you've been outbid for an item, for instance, when it would be an easy and inexpensive process to fire an email suggesting that you increase your offer.

Online auctions fall a long way short of the thrill and atmosphere of a real auction room. But that said, any bargain hunter can see their appeal, as it is possible to find some good deals. For instance, lastminute.com had a week staying in an apartment in Portugal that went for £200, and Quixell regularly sells high-spec PCs for around £400. If you do your research on prices and decide what your highest bid will be, then the chances are that you'll get what you want at a price you can be pleased with.

The UK sites

Needless to say, some sites are better presented than others. The better ones attempt to assuage any nervousness you might feel about giving them your credit card details with assurances of their credentials – how long they've been in business, who started them, who their backers are, and a privacy policy statement. Person-to person sites also contain warnings about selling pirated software and services like mobile phone subscriptions.

Most ask you to register with a nickname, your email address and credit card details. It's worth noting that you may be refused registration by some of the sites if you use a free email service such as Hotmail or Bigfoot. The better ones also include answers to frequently asked questions, a section which shows you how to bid and the chance to practise in a fantasy auction. The more switched-on will email you with details of lots which may interest you in forthcoming auctions. Some of the more poorly presented sites don't make it clear whether the goods are new or secondhand, or whether they come with any sort of warranty. All sites cover themselves legally with plenty of disclaimers and rules about how to conduct business.

There are alarming tales of a stolen Kentucky Derby trophy up for sale and a 13-YEAR-OLD who nearly managed to buy a Ferrari

The person-to-person sites in the UK suffer from a dearth of merchandise. Whereas eBay in the US can boast it has nearly two-and-a-half million items for sale in over 1,600 categories, eSwap, one of the busiest of the UK person-to-person sites, has about 1,200 items for sale in 13 categories. Other sites like ezvendor.com or computercarboot.com may only have 10 or, at best, a couple of hundred items for sale.

The longest established UK business-to-consumer site is quixell.co.uk. Formed in 1997 and backed by respected venture capitalists, it has the broadest spread of products of all the UK sites. On offer are computers, white and brown goods, jewellery, sports and fitness items, small gifts and accessories, with plenty of items up for grabs in each category. All items come with a photo and full product description. Products are dispatched within five working days and Quixell operates a 14-day money-back guarantee.

A CAUTIONARY TALE

At a recent Quixell auction, *PCW* reader Mark Kendall successfully bid for a 56K modem and 64Mb of SDRAM. He was promised delivery within five to seven days. 'Then the problems started,' he says. 'First I didn't receive a confirmation email, as I had on previous occasions. After a week I sent them an email voicing my concern, then two days later I wrote again as there had been no response.'

Quixell replied saying that Mark had entered the right email address when bidding, but quoted the wrong email address as the one that his confirmation email should have been sent to. Mark waited three weeks for his goods, and threatened legal action. A parcel then duly arrived, containing a piece of bubble wrap and nothing else. The enclosed invoice stated that there was nothing to follow and that the unit price of the modem was £00.00. But Mark's credit card statement showed he had been billed the full amount of his winning bids for both items plus delivery.

Quixell then told Mark that it didn't have the memory to sell in the first place and refunded his money. He eventually got the modem. He comments: 'This dispute went on for over a month and in that time my emails were passed from department to department with no satisfactory answer forthcoming. My trust in the online shopping experience has been diminished. I feel that to gain the trust of people willing to purchase items over the Net, this kind of company has to do more than operate as a high-street store on the Net.'

Auctions are held daily, with closing times at 1pm and 10pm, and traffic on the site is heaviest at these times. Quixell has also started to host auctions for other companies, including a section where it sells off holidays on behalf of travel companies and airlines.

'We're recording four million impressions a month,' says marketing manager Rick Jones. 'And we have a revenue run rate of £12m.' He says Quixell has even sold houses and cars in the past. Most potential punters are already clued up on pricing before they visit the site, but there are instances when an item sells for more than its retail price. Quixell also has a person-to-person auction area on the site.

Taking a different approach, Auctionhunter was formed this year by regional newspaper group Newsquest. An online version of the papers' classified ads, it has an extensive collection of listings, selling everything from cars to cases of wine. Sellers must be registered and maintain a minimum balance of £10 in their account. Auctionhunter charges for listings, and the sales commission is 2.5 per cent. There is no buyer's premium. Once the auction has closed it is up to the buyer to contact the seller to arrange payment and delivery. Offering a similar service, Eswap.co.uk charges for its listings, but does not charge sales commission or a buyer's premium. Computercarboot.com, ukauctions.com, and buy-sell.co.uk run along similar lines but with comparatively few items up for sale.

George Brown and Jim Payne recognised the value of online auctions when they were creating a complete Internet business. 'We started the auctions as a way of getting people into the site to see what else we do,' says Payne. The majority of the lots on Bullnet.co.uk are computer-related, but Payne says the site has found surprising hits in other areas. 'It's items that are a bit unusual which do well,' he says. 'For instance, our lock-picking sets have been very popular.'

As with any type of business, it's important to capture the attention of potential buyers. Theauctionchannel.co.uk occasionally broadcasts specialist auctions on Sky Sports, such as the one for tennis memorabilia in the run-up to Wimbledon. The site's NetBidLive system allows the auctioneers to take bids over the internet at the same time as telephone bids and bids from the saleroom floor. Auctions coming up include Phillips rugby memorabilia on 4th October, and several property auctions.

Other sites to cast an eye over include: Lastminute.com – a good site for holidays and short breaks. The offers are usually posted only a short while before they are due to be taken up. The site also auctions antiques and jewellery. www.morgan-auction.co.uk is the auction website of the Morgan Computer Co. Sandafayre.com is an unpleasant-looking site for stamp collectors. Auctions are held every week, with over $1m-worth of stamps available online. Icollector.com auctions fine art and collectibles. Onlineauctions.co.uk is an auction site similar to Quixell, mainly selling computer equipment. Auctions.yahoo.co.uk was only formed in May this year. The site is an Anglicised version of the US site, with all products originating in the US and all bids in US dollars. Bidders have to pay the shipping charges from the US. ❐

Most potential punters are ALREADY CLUED UP on pricing before they visit the site, but there are instances when an item sells for more than its retail price

Remote Control

Illustration by Simon Downs

IF THE RUSH-HOUR RAT RACE IS A REAL PAIN, YOU MIGHT FIND IT MORE AGREEABLE TO WORK AWAY FROM THE OFFICE. GORDON LAING EXPLAINS THE ATTRACTIONS OF, AND REQUIREMENTS FOR, REMOTE WORKING.

People are changing. Work is changing. As we approach the new millennium, the clichéd nine to five is looking like an increasingly endangered species. Why waste time traipsing into town during rush-hour when you could work at home? Why work at home when you could work on a beach – in a foreign country? Many workers are realising that they could do

some, or even all, of their work elsewhere.

Technology is, of course, the great enabler, but what's involved in setting up a home office? Does the purchase of a notebook make you an effective mobile worker? And what about where you intend to do your work?

In this feature we'll be looking at the issues involved in setting up a home, remote or mobile office for either part or full-time use. We will also review the technology that will allow you to realise this dream.

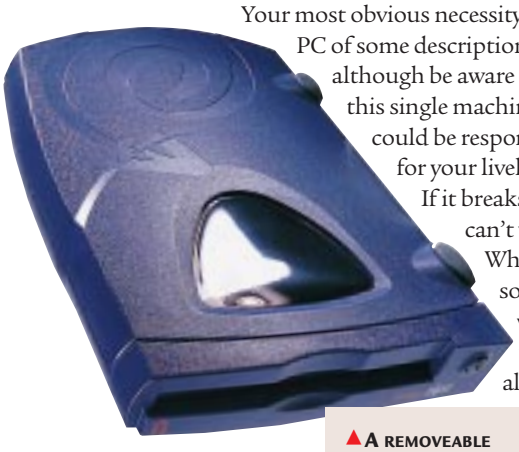
Office equipment and general facilities are the last things most remote workers think of. Well, think again. If you're serious about spending a lot or even all of the time working from home, you'll quickly begin to miss the office facilities you always took for granted. Good ergonomics are also essential. You should have a decent chair and desk, and make sure you're not straining anything – eyes, wrists or otherwise.

Remember, you're not just accommodating a PC. You've also got to find room for a desk, chair, office equipment and plenty of storage for all those unexpected materials. In the future, we may all laugh at the futility of the paperless home.

If you've not gone entirely freelance, ask your employer about contributions for setting up at home. Remember you're doing them a favour by becoming more productive and saving them office costs, so it's not unreasonable to ask them for compensations in return for your sacrifices.

■ Setting up a remote/home office

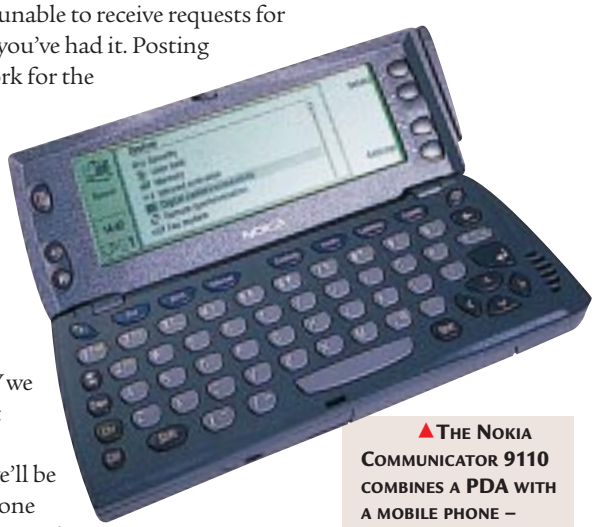
Your most obvious necessity is a PC of some description, although be aware that this single machine could be responsible for your livelihood. If it breaks, you can't work. While the software we've tested allows MIS (Management Information Systems) staff to remotely reconfigure your system, it's of no use if your PC won't power-up.



▲ A REMOVEABLE STORAGE DRIVE, SUCH AS THE IOMEGA ZIP, IS VITAL FOR BACKUP

Backup is essential, both in terms of a second machine and of course your vital data. If you've been sensible enough to fit a backup device, make sure you remove the media. After all, fire, flood or theft are unlikely to remove the tape and leave it in a safe place. Speaking of which, you'd better make sure you're insured for this, too.

Second most obvious are your communications. These are absolutely crucial, because if you are unable to receive requests for work or deliver it, you've had it. Posting floppies might work for the most basic requirements, but it's hardly the height of sophistication – plus you'll need stamps and a nearby letterbox.



▲ THE NOKIA COMMUNICATOR 9110 COMBINES A PDA WITH A MOBILE PHONE – KILLING TWO BIRDS WITH ONE STONE

In the August 1999 issue of *PCW* we looked in depth at communications technologies, so we'll be brief here. One phone line is of course essential, but again, if this office is to be your main one, you'll quickly hanker after another.

Who wants to be unobtainable to phone calls when sending email or browsing the web? Who wants to admit that they have to hang up this voice call and reconfigure their lines before being able to receive a fax? A second line also allows you to more easily separate business and personal charges, which can be a real boon when it comes to claiming expenses or filling out a tax return.

Speak to any remote or mobile worker and the one technology they'll always curse is their communications system – it's never fast enough. If you've worked for a large company, you'll miss fast and free access to the internet. If you're relying on a single 56K modem, you'd better be prepared to wait for files to transfer. You'll also become painfully aware of the wasted bandwidth occupied by pointless email jokes and chain letters, not to mention huge attachments that are sent without consideration of their size.

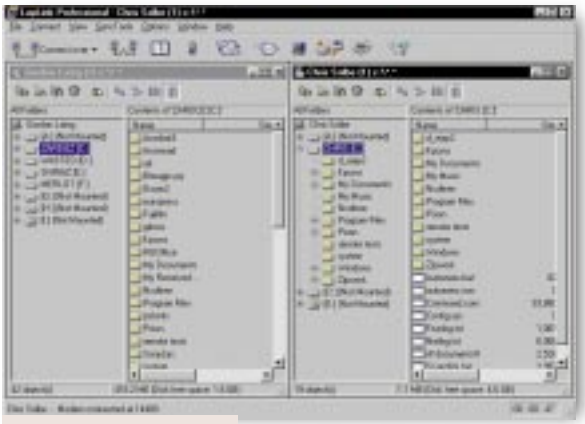
One final word: make sure your ISP is reliable, and available when you want to use it. You may have to dump your free account, but remember, this is your livelihood.

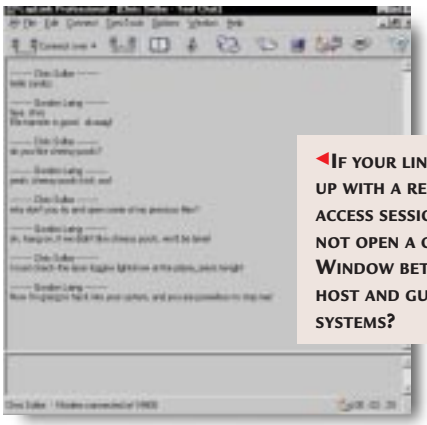
■ Setting up a mobile office

A notebook or handheld PDA is the minimum required for a mobile office. The same backup and insurance applies even more so, as a portable is particularly susceptible to theft or breakages.

Remember you're on battery power, so learn how to make the most of any power-saving utilities. Particularly vigilant users may want to download Intel's Power Monitor to check up on which background Windows utilities are the hungriest – you may get some surprises. Either way, make sure you're fully charged and that you're carrying spares where possible.

Communications in fixed environments are similar to those for desktop PCs. Almost all





▲ LAPLINK'S FILE TRANSFER WINDOW IS AS SIMPLE AS DRAG AND DROP, ALTHOUGH YOU CAN'T USE STANDARD WINDOWS TOOLS TO PERFORM THE SAME OPERATION

◀IF YOUR LINE'S TIED UP WITH A REMOTE ACCESS SESSION, WHY NOT OPEN A CHAT WINDOW BETWEEN HOST AND GUEST SYSTEMS?

portables can connect to modems of some description, and often to ISDN too. The predominant interface is the PC Card, although an increasing number of portables (albeit mostly PDAs) are being fitted with built-in modems. It's worth checking a built-in modem's capabilities, as many older PDAs only operate at 19.2Kbit/sec. It goes without saying that anyone wanting to connect a modem to a foreign landline should carry a selection of adaptors.

Portables really come into their own with mobile communications, for which you'll of course need a mobile phone. In the old days, you'd need a PC Card interface for your mobile, but modern models often come with built-in data capabilities.

Look out for Ericsson's SH888 and Nokia's 8810 mobiles, both of which boast built-in data facilities and IRDA-compliant infra-red ports for wireless connection with your notebook or PDA. Note that Nokia's popular 6110 (aka NK702 for Orange) does feature infra-red, but no data hardware – for wireless operation you'll need to install Nokia's Cellular Data Suite, available only for Windows 95/98 notebooks but, sadly, not for PDAs.

Bear in mind that today's GSM data rates are limited to a mere 9.6Kbit/sec, although this is sufficient for basic email. Mobile data is set to increase dramatically over the next two years, eventually maturing into 2Mbit/sec rates [News Analysis, *PCW* September 1999]. The first enhancement is expected from Orange this September, which aims to launch a 28.8Kbit/sec data service for new phones.

Incidentally, a GSM mobile employs a digital connection which, like ISDN but unlike an analog modem, can negotiate a link almost instantly. Some ISPs offer specific access numbers for mobiles, such as Demon for Orange. Mobiles also often work out cheaper overall for data calls than hotel phones.

If you intend to use your phone abroad, talk to your operator about roaming agreements. Remember there are currently many more 900MHz GSM networks worldwide than 1,800MHz ones, and that North America employs GSM frequencies of 1,900MHz.

World mobile travellers should seriously consider buying a dual – or even triple-band phone. Our top tip for mobile upgraders is to wait for Nokia's forthcoming 7110 dual-band

Mobile locations

Consider the additional complications of a mobile location for notebook and PDA users. Obviously, the issues concerning power, communication and facilities completely change. You'll be lucky to find a power socket for your notebook, and plugging your modem into a phone line will be impossible. You'll be forced to send any emails or files via your mobile phone and just pray that your batteries last the course. But there's more besides.

Perhaps you'd like to go outside? Apart from the fact that almost all notebook and PDA displays as good as disappear in direct sunlight, you'll also suddenly discover the numerous distractions. With dogs and children running around, the park or the local café are suddenly transformed into a canine and nursery hell.

When you're on the move, trains and planes seem quite reasonable places to work until you've actually tried. The former usually rattle around so much you can't type, hand-write or even hear yourself speak on the phone. The latter are, conversely, so quiet you'll have fellow passengers attempting to escape your incessant tapping by jumping out at 30,000 feet. Also remember your particularly cramped space.

Modern office workers often complain that there's never enough meeting rooms, but when you've moved out, there's none at all. The remote or mobile worker may find themselves attempting to conduct serious meetings in the aforementioned locations.

Better bets are relaxed restaurants or even hotel lobbies. Sadly, the ones which seem most tolerable to such visitors tend to be located in the very city centres you're trying so hard to avoid. You may be better off meeting clients at their offices – this saves them any hassle, and of course gets you out of the house.

mobile with WAP (Wireless Application Protocol) Microbrowser and built-in infra-red data hardware.

Whose file is it anyway?

So you've bought the required equipment to break free from the office; now, how do you do it? The biggest issue beyond slow or unreliable communications, is making sure that you've got the required information, and that it's up to date.

If you find yourself regularly working between two systems, it's crucial that both can access the other's data, and that it be synchronised. It's no good having two different files or schedules with the same name – which one is correct?

Clearly, it's vital that the systems attempting to remain synchronised are both speaking the same time and date; bear this in mind when travelling too, and use a visiting time-zone setting, rather than resetting the clock which stamps your files. If your clocks are correct, then there's nothing stopping you simply comparing files by hand to verify which is the most recent.

Document and email folders can happily be copied wholesale from one system to another as you travel between locations. It may be low-tech, but you can fit a lot of messages on a floppy and a lot of documents on a ZIP or JAZ cartridge.

If removable media isn't suitable, then consider a direct cable connection (DCC). Windows 98's DCC supports file transfer over serial and parallel, but not USB connections. Windows 98 also supports infra-red file transfer between IR-equipped devices. Applications such as Office 2000 are becoming increasingly savvy to shared documents or areas where files can be stored, ready for pickup by another system.

Finally, if you don't mind downloading messages twice, you could set one of your system's email clients to leave a copy of the messages on your ISP's server so they're still available when your other system accesses them.

PDAs are becoming increasingly powerful, but almost all expect to be connected to a host PC. Consequently, the more sophisticated models – such as the Psion Series 5, those using Windows CE and the 3Com Palm – all boast effective document, email and schedule synchronisation tools. All three will happily chat with your PC and swap information, so that both machines are up-to-date. Bear in mind that most PDAs prefer to compare notes with fully-fledged PC Personal Information Managers such as Schedule+ and Outlook, and won't want to speak with small email clients such as Outlook Express and Netscape Mail.

Remote **Access Packages**

Notebooks running full Windows operating systems may as well be desktop PCs in terms of built-in synchronisation tools. They'll work with DCC and the various sharing systems described in the main text, but for more sophisticated exchanges you'll need to invest in some dedicated software.

We looked at Traveling Software's LapLink Professional, Symantec's pcANYWHERE 9.0, and Stac Reachout Enterprise 8, all tested under Windows 98 but also available for 95, NT and 3.1/DOS. All offer remarkably similar remote access and file transfer facilities, but with a slight bias towards different users. We'll mention shared features and pick out where each differs.

◄ pcANYWHERE's Remote Control. Note the guest has launched an audio file on the host, but only the host can hear it playing. Remote control only communicates the pointer's position and any keyboard strokes

pcANYWHERE's 'Remote Control' allows you to see another PC's desktop in a window on your very own screen. You can operate the remote PC as if you were there, exploring drives and network connections, launching applications, printing pages and changing settings. The PC being controlled shows the pointer moving around and characters being typed as if by a phantom presence – spooky. The remote desktop can be scaled to fit your window and displayed in a reduced number of colours, with wallpaper disabled for better performance. Even at 14.4Kbit/sec, Remote Control still felt quite responsive, which is reassuring for mobile phone users.

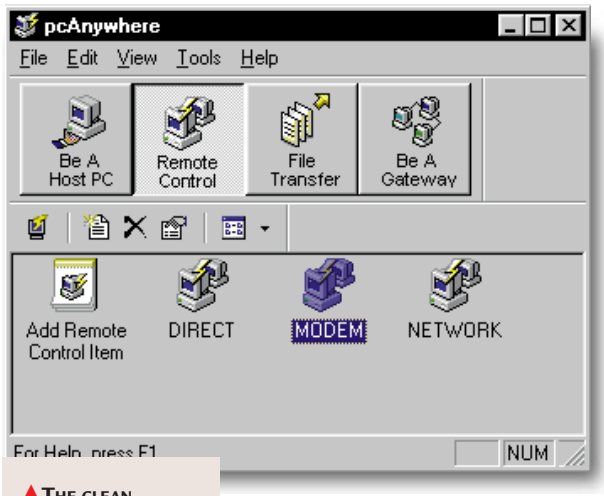
Clearly, Remote Control is great for checking or acquiring data you forgot to bring with you, and is equally useful for MIS departments to diagnose and directly fix problems. It's also obvious that some level of security is in order. LapLink, pcANYWHERE and Reachout all offer varying levels of access to a

The mobile office

defined list of users, and can also force a hangup and modem callback to listed numbers only for added security. Access is via cable, direct modem (or ISDN), IR (where supported) or a variety of network protocols including TCP/IP. TCP/IP requires you to know the IP address of the target machine, although those which employ dynamic allocation (DHCP) are able to use dedicated WINS servers.

File transfer is as easy as drag-and-drop in a Windows Explorer style environment, with the host PC in one pane and the guest alongside. However, you can't open a remote document within an application before transferring it to your local PC, and while the drag-and-drop is simple, you can only perform it using the software's own tools: you can't drag a file from the remote window directly onto your local desktop, for example, but you can copy a remote item into the local clipboard. Each package offers various wizards to synchronise files in pairs of folders, which is a great way of keeping, say, your email inbox and current working documents folders up to date.

Of course, sometimes files change only slightly: you may have a 100-page document with a single word changed, or an image retouched in one corner only. Transferring the entire file again is obviously a waste of bandwidth, so fortunately all three packages recognise any changes and only send the differences. We verified this by observing shorter update times when slightly modifying Word documents, bitmap files and even multi-layered Photoshop 5 images. All three packages also automatically compress files for better performance.



▲ THE CLEAN INTERFACE OF PCANYWHERE WITH ICONS FOR ITS VARIOUS MODES

Differences between the packages are subtle. On the supplied cable front, pcANYWHERE comes with a 25 to 25 pin serial, LapLink is accompanied by 9 to 9/25 pin serial, while meanie Reachout features none. Cables are cheap though, so don't make a buying decision based on this. However, LapLink is currently the only one to support an optional USB cable for a 12Mbit/sec connection between Windows 98 systems (£25).

Presentation is slightly different between the packages. LapLink, with its large, friendly icons, is the most consumer-looking offering, while pcANYWHERE and Reachout's graphics will appeal to the small business or corporate users. With USB support, LapLink offers the most comprehensive file transfer options, while Reachout markets itself to 'centrally-managed corporate remote control', and pcANYWHERE sits somewhere between the two.

Finally, it's worth mentioning that LapLink and pcANYWHERE are also available in Windows CE versions, the former as a free 3.5Mb download to registered LapLink Pro users, and the latter as host or remote flavours for £79 and £39 respectively. We were unable to get hold of pcANYWHERE CE, and LapLink CE inexplicably failed to run on our HP Jornada 680.

Finding a winner is hard, as all three packages do essentially the same thing and there's no difference in cost. Ultimately it boils down to which interface you prefer. pcANYWHERE certainly looks the smartest, but with optional support for both USB connection and a free Windows CE version, LapLink Professional fractionally nudges ahead to win Editor's Choice.

PCW DETAILS

★★★★

Reachout Enterprise 8
Price *£175.08 (£149 ex VAT) (two licences)*
Contact *Stac 01344 302900*
www.stac.com

★★★★

pcANYWHERE 9.0
Price *£169.20 (£144 ex VAT) (two licences).*
Upgrade *£66.98 (£57 ex VAT)*
Contact *Symantec 0171 616 5600*
www.symantec.co.uk

★★★★★

LapLink Professional
Price *£176.19 (£149.95 ex VAT) (two licences)*
Contact *Traveling Software 0800 374849*
www.laplink.com

Intel Power Monitor
http://channel.intel.com/mobile/tech forum/sw.htm

The third way

Creating 3D images has traditionally been seen as expensive or time consuming, but all that is about to change. Adele Dyer makes the jump to another dimension.

3D is only good for one thing, some would say – games. But all that could change in the next few years as 3D cameras and printers come onto the market at an affordable price. The 3D camera will allow you to photograph objects and recreate them in the camera itself, before transferring them to a PC. The 3D printer, meanwhile, will make it much easier for designers to create quick, cheap 3D models of the objects they are working on. Until recently there were only two ways to create 3D images – either use a 3D laser scanner to record an existing object, or use CAD or 3D rendering software to draw the object from scratch.

The impetus behind the 3D digital camera is unusual in that it comes from a software, rather than a hardware, vendor. MetaCreations – known for graphics and Web-creation software such as Painter, Poser and Ray Dream Studio – has created a hardware and software combination, the MetaFlash, that fits on to certain cameras. Minolta will be the first manufacturer to produce a 3D camera, the 3D 1500, which uses the MetaFlash and the Dimage EX as the basic unit. Minolta plans to release the camera in the autumn. The 3D 1500 has a detachable lens and so the MetaFlash hardware fits between the camera lens and the camera body, attaching at the point where the lens has been removed. The lens is then attached to the other end of the MetaFlash hardware, effectively putting it in the middle of the camera.

Working with the MetaFlash hardware, the camera does not flash once, but twice. The standard digital camera flashes to provide enough light for it to take the normal 2D image, while the MetaFlash flashes an additional series of thin lines of light. These stripes of light are then captured as a second image and the software can calculate – by looking at where the stripes are lighter or darker – whether the shape at that point is concave or convex. The second image is then superimposed over the first, and, using a technique known as structured-light-based triangulation, the software in the camera uses the information gathered from the stripes to turn the flat image into a 3D image. The geometry of this technique is, we were assured, quite easy, as the distance between the light source and the lens is constant. However, ambient light should be kept to a minimum, the object should be placed between 30cm and 1m away from the camera, and, most importantly, the object must fill the entire picture. This technology can be used not only to determine shapes, but also to pick up textures, again shown by the diffusion of the light.

This first iteration only takes images from a single view, although more than one image can be stitched together on a PC to create a complete 3D object. The next version of MetaFlash aims to eliminate this stage and to create the entire 3D

▼ MetaCreations' MetaFlash fits between the lens and the body of the Minolta 3D 1500

object in the camera itself. Kodak plans to use this next version, which will work with a turntable. As the object is spun around on the turntable, the camera will track the surface of the object and determine how many shots it must take in order to compose a complete 3D object. The software in the camera will then stitch these views together to create an object that can be spun around horizontally. Shots of the top and bottom of the object will, once again, have to be stitched on using a PC.

3D images captured in this way can be used for any number of purposes, although Kodak has its eyes on Internet and intranet use. For example, if you have a company that makes wedding dresses, you could put 3D images of the garments on your site, allowing retailers or customers to see how they look from all angles.

The 3D printers are a little simpler in operation. Known as concept modellers, these printers are small enough and quiet enough to sit in an office and can produce 3D models in a matter of hours. Previously, the only options available to those who needed models were either to use plastic extrusion modellers – which are only suited to certain uses – or to use stereo lithographic modellers, which are based around lasers and can only be used in a clean room, free from all dust and dirt.

Bix Computer Applications sells a concept modeller known as the ThermoJet, designed by 3D Systems. It works in very much the same way as an office inkjet works, squirting material out of a series of nozzles. However, the difference is that the image can be built up in layers to form a 3D object.

Images to be output are created in a CAD package and output to the printer as a .stl file. The printer's drivers first splice the image, cutting it into thin sections horizontally from top to bottom. Then the actual printing can begin.

In the future everyone could have one of these printers in their garage

The material used is a kind of wax, which is constantly heated and kept in a liquid state. The wax is then sprayed through an array of 352 jets, which move backwards and forwards across the printer. In each pass, a layer of wax 0.36mm thick is laid down. This dries very quickly and so the wax is solid before the next layer is applied.

The process is relatively quick, with the time taken dependent on how tall the model is. Bix calculates it takes around about an hour to build 1.5in of the model. So, something small like a mobile phone could be created in a couple of hours and for a cost of around £5. However, the printer does not speed up when creating smaller objects as it still takes the same amount of time for the jets to cross the printer. In fact, to increase the time-efficiency, it makes sense to print two or more models at a time – covering the 10in-square base with various models.

Once the model is complete it is still slightly warm, so Bix suggests you should leave it in the machine for half an hour or put it in the fridge to firm up.

At the moment, this kind of system is being used mostly by companies that are working on multiple iterations of the same design. So, for instance, if a client has commissioned a design for a new telephone, but wants to see four different variations on the same idea, all four can be created quickly and cheaply. Similarly, the designers can show one model to the client in the morning, get their feedback and show them a modified model in the afternoon.

In the future, it could be that every household has one of these printers in the garage and it could be put to any number of different uses. Your children, for example, could find the design for a new toy on the Internet and download it to the printer, cutting out that maddening trip to Toys 'R' Us. Or you could browse for new objects for your home and be able to print out a 3D model before you actually decided to buy them. ❐

▲ **The ThermoJet solid-object printer, which allows designers to produce highly accurate physical models of their designs direct from their CAD systems. The ThermoJet is available in the UK from Bix Computer Applications, a division of Cadtek Systems**

PCW CONTACTS

Bix Computer Applications *0115 840 4069* ***www.bix.co.uk***
Minolta *01908 200400* ***www.minoltaeurope.com***
Kodak *0800 281487* ***www.kodak.co.uk***

Stringer show

Talking shop with Roy Stringer has always been a matter of flying in the face of convention. Ian Burley gets a lesson in re-educating the IT industry from the Navihedron pioneer.

In a time in which most of us continue to be astonished by what the electronic medium is capable of in conveying information across the globe in an instant, there are some who are far from happy about the way the IT industry is developing. One such person is Roy Stringer, who currently carries the impressive tag of creative director and chief hypermedia architect at the Liverpool-based multimedia production company, Amaze Ltd.

I'd reluctantly use a well worn cliché to describe Stringer – he's a guru, a hypermedia guru. He has his own gurus too and a significant influence on Stringer is Ted Nelson, who invented the terms hypermedia and hypertext. Stringer wholeheartedly echoes Nelson's battle-cry for a change to hypermedia standards:

'Electronic media and hypertext are completely screwed up. But this is hardly surprising, because the computer world itself is screwed up, tangled in dumb decisions made long ago, making it fundamentally a mess. It's time to start over.'

Stringer will argue vehemently that compared to today's ubitiquitous IT scene, HYPERMEDIA IS DOWNRIGHT FUTURISTIC, yet its origins date back to the 1960s

Even the Web is a target for criticism – Stringer points out that its power is too often wasted by poor design. This, in turn, relies too heavily on the linear presentation of data and unwieldy hierarchical structures which are themselves difficult to navigate. It's not in Stringer's nature to sit around philosophising about the deficiencies in the computer world – he's actively trying to get us to break away from the old 'linear' way of presenting and absorbing information. This guru is also an evangelist.

Stringer describes himself as an 'independent, self-taught multimedia producer, hypermedia architect and techno-therapist.' His claim to fame is the concept of the Navihedron – a three-dimensional hypermedia navigation tool which utilises bi-directional linking and context sensitivity. Stringer expects this will replace the system of hierarchical menus we are all so familiar with today in the design of computer user interfaces, applications and websites.

Another spotlight is about to shine on Stringer as he is in the middle of a major Navihedron-based collaboration with the famous physicist and author of *A Brief History of Time*, Stephen Hawking. This is *Stephen Hawking's Virtual Universe*, an online realtime 3D environment to explain the principles of theoretical physics.

When I spoke to Stringer, we were at the British Academy of Film and Television Arts (BAFTA). In a couple of hours, Stringer was due to rehearse for his presentation that evening to a BAFTA organised event called *Interactive Learning in Education*, sponsored by NESTA, the government funded National Endowment for Science Technology and the Arts. Stringer was to share the limelight with both the movie director and producer David Puttnam and the Culture Secretary, Chris Smith.

Out of Stringer's bag emerged a brand new Apple G3 PowerBook – the latest slimline version. He was determined to show off his and Amaze's work – a multimedia exploration of the human immune system called Immunology. It's an early example of the use of a Navihedron user interface. The Mac is Stringer's platform of choice, he even worked at Apple for a while, but his crusade to change information technology is nothing to do with hardware standards.

An enormous white blood corpuscle edges across the PowerBook's screen, and as it encounters one of a myriad of other blood components and biological invaders, an accompanying Navihedron window of linked information changes automatically in synchronisation with the unfolding context. As

Stringer's fingers caressed the PowerBook's touch pad, the blood cell animation moved backwards in time – we could relive the experience and re-absorb the tale again, reinforcing the concepts which were being introduced to us. Every bit of information held in this hypermedia 'book' is accessible in three clicks of the mouse. Try doing that with Yahoo...

A bottomless well of energy seems to emanate from Stringer, he has so much to say and is consumed by his passionate self-belief. His conversation dances between topics as wide-ranging as literature, art, science, and philosophy. You could be talking to a university lecturer, but Stringer had a very unconventional education.

His experience of university started at the age of 12, but didn't actually involve going to lectures. It involved watching the Open University on television. Later, at the stage when many teenagers think about specialising in a favoured subject in preparation for university, Stringer and the education system went in opposite directions. Stringer has never let convention hinder his thirst for knowledge. The traditional education system, from his early teens, could not cope with Roy Stringer, but years later he would renew his links with the education world by joining the staff of the Learning Method Unit of the Liverpool John Moores University. This was later spun-off as an independent business, which became Amaze Ltd in 1997.

We tend to think of hypermedia as being an ultra-modern concept. Stringer will argue vehemently that compared to today's ubiquitous IT scene, hypermedia is downright futuristic, yet its origins date back to the 1960s. Stringer remembers how his interest in hypermedia began: 'I started hearing about computers and hypermedia when I was about 12, which is going back about 31 years now.' It was a difficult time. Stringer's father died when he was seven. He has his mother to thank for his interest in computers – indeed, for his interest in education altogether.

'I remember saying to her that I was bored one day, like 12-year-olds do. She told me I had no right to be bored because there were too many things that I didn't understand and that these things I could work out for myself. She got me up the next morning at 6am, and sat me in front of the TV to watch the Open University.'

Roy Stringer

He was hooked, but after this nobody at Stringer's school understood what he was going on about most of time, talking about relativity, quantum mechanics, social history, Mondrian and other esoteric university topics.

By the time he left school, Stringer had come across computers through the Open University. It was then that Stringer became acquainted with the terms 'hypertext' and 'hypermedia', coined by Ted Nelson back in 1965.

Hypermedia was a step beyond the television and worlds away from the philosophy of the classroom. 'I remember thinking how nicely that model mapped on to my own understanding of what the purpose of information was about – as opposed to the way they were trying to instil it into you. So that was when I started thinking about hypermedia and ways of actually engineering it.'

One theory as to why computing is 'screwed up' – to re-quote Nelson – is that programming is a dying skill. Stringer is concerned that these days we aren't exposed to the practice of programming any more. 'I was on a panel at a Macromedia conference a couple of weeks ago. The panel was discussing whether or not designers were valued properly and I asked the audience there if anyone considered themselves a programmer or even a half-decent programmer, and not a single hand went up.' According to Stringer, using tools like Director simply to create animations inside frames is not programming. 'We're missing opportunities to do interesting and engaging interactive things with Director; instead people are just using it to make their print designs move around a bit.'

Awareness that the standard graphical computer user interface model exemplified by Macs and Windows is incredibly old in computer terms sparks near-resentment in Stringer: 'Like anything with a metaphor, the metaphor will always constrain you. It's like the desktop metaphor is constraining what you can do with PCs and Macs now. For the life of me I can't understand why we haven't got a full-on 3D working environment on the desktop. Why we are stuck with a 2D symbolic plane with little icons in the corner just defeats me. It took us seven years to go from a command line interface on a personal computer, like my Nascom stuff, to the first graphical user interface. We've had graphical user interfaces for 15 years now and they still haven't changed.'

Stringer warns that 3D has its own limitations: 'I'm not sure that immersive 3D environments are conducive to work environments on a computer screen. Again, it's too metaphorical. A car isn't a metaphor for a horse and carriage – it used to be, but it isn't any more. A motor car isn't a horse and carriage and so a computer isn't an office desk.'

Even that holy grail of computing, voice control, is too metaphorical, according to Stringer: 'The metaphor there is the conversation. I don't think we're even close with the technology. All I can ever see in those implementations is DOS – precise syntax which makes precise things happen. If you don't say things in the right order, it won't understand you.' True machine understanding could make voice control viable, but Stringer feels that scenario is a long way off yet.

In the meantime, you will soon be able to download a Navihedron applet which manages your computer's shortcuts. Called My-Nav, the applet will be available from the official Navihedron website at www.navihedron.com.

The inherent geometrical simplicity of the Navihedron has triggered other ideas, like N-Space. This idea, which Stringer has patented, is a remarkably easy and logical way of using the nine numbers in a telephone keypad for information navigation. N-Space could become a hit with the emerging generation of multimedia-enabled mobile phones, for example.

Stringer has a couple of bees in his bonnet about the future. He enthusiastically predicts that within five years the internet will be the primary source of digital media, including audio-visual media. His expectation relies on rapid growth of internet bandwidth and end-user accessibility, but he rejects the concern that five years is too soon.

He also predicts that within 10 years, women will replace men as the dominant gender in IT. Stringer feels that today's IT smacks too much of 'men's toys'. IT is an enabling technology for communication and as women are usually better communicators than men, IT will provide women with a key advantage.

Roy Stringer represents that next generation in the evolution of the personal computer. He wants to see PC concepts move away from narrow metaphors to a more user-environmental view. With its vested interest in market stability, Stringer is up against the corporate inertia of Microsoft and even Apple. However, Stringer believes, and many others hope, that innovations such as the Navihedron, My-Nav and N-Space will usher in that new era – sooner or later. ❐


TAXAN
MESH

7th heaven?

AMD's bold claims for the first-ever seventh generation processors — that they are PIII beaters — are put to the test as the Athlon is asked to account for all the hype.

AMD has generated a lot of hype around its latest processor, the Athlon, codenamed the K7. The claims have been ambitious. AMD says the first ever seventh generation processors will outperform Intel's sixth generation Pentium III. The processors are very new and the motherboards are even newer, but we have managed to persuade some manufacturers to part with their prize possessions and allow us to put the first Athlon machines through their paces.

We were most interested in whether our vigorous benchmark programs would find the Athlon as fast as AMD claims, and whether it really does outperform the Pentium III. With regard to the machines themselves, we wanted to see if the manufacturers had maximised the potential of the chip with high-quality supporting components.

The choice of graphics card was especially important, because we wanted to see whether the improved 3DNow! instructions really did make a difference. We also asked for some kind of backup device to be included, to ensure that each machine in the group test had a well rounded specification.

Contents

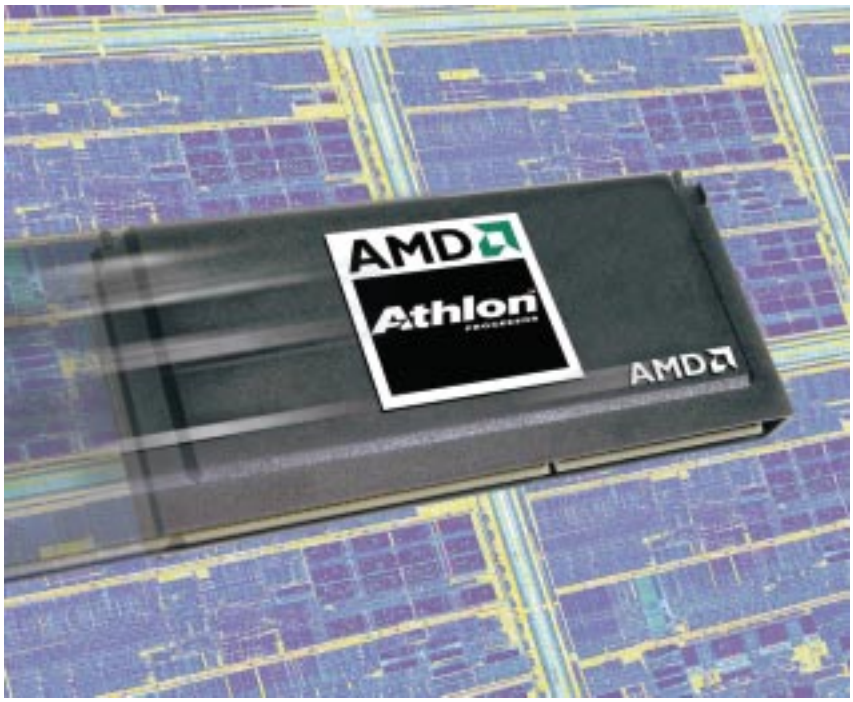
• *Tested and reviewed by Riyad Emeran and Jason Jenkins*

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

AMD: the long road from K5 failure to **K7 confidence**

In producing the Athlon, Advanced Micro Devices (AMD) has built upon the expertise it acquired through years of making processors. Founded in 1969 by Jerry Sanders and seven others, it has grown from humble beginnings in the founders' lounge to a multinational company that employs over 13,000 people worldwide and represents Intel's greatest threat in the processor market.



Always involved in the design and manufacture of processors for a variety of markets, AMD's recent history begins with the K5 processor. Up until this point, the company had been producing 286, 386 and 486 processors that were directly derived from Intel's own designs.

The K5 was AMD's first independently produced x86 processor and was intended to break Intel's domination of the market by being faster and cheaper than Intel's range. This was more difficult than the company had hoped for, however, and the chip was late to market. Running at various speeds between 75MHz and 116MHz, the chip suffered from performance and reliability problems that meant it never really threatened Intel's grip on the market.

After the relative failure of the K5, AMD realised it had to do better. The answer to its design problems presented itself in the form of the acquisition of Nexgen in 1996. Using Nexgen's chip designs as the basis for a new family of CPUs, the K6 has been more successful.

There are two versions still available today. The K6-2 – launched in May 1998 to compete with the Pentium II, which had been released one year earlier – was hampered by a lack of fast Level 2 cache, although the low price made it a very attractive option.

As AMD started to win market share, Intel was forced to introduce the Celeron processor – essentially a budget version of the Pentium II – to avoid losing the budget market. The use of the 3DNow! instructions was intended to improve 3D performance for software that was specially optimised, a factor that made the K6-2 more attractive to gamers. Intel has emulated this idea in its Pentium III through the KNI instruction set, which does pretty much the same thing.

By the time of the K6-III launch earlier this year, AMD had established itself as the only serious rival to Intel in the Windows-compatible processor market, with National Semiconductor selling the other main player – Cyrix – to Taiwanese company VIA.

Despite the technological advances, however, life has been far from plain sailing for AMD. Aside from trying to persuade manufacturers to adopt the technology and the public to buy machines that do not have the Intel Inside logo on them, its main problem has been producing the chips in sufficient quantity to meet demand.

Recent financial results have not been good, with the latest showing a net loss of $162m for the second quarter. AMD says a combination of production problems and high research and development costs for the Athlon have caused these losses, although they were not as bad as some pundits predicted. This is undoubtedly true, but sales cannot have been helped by the fact that customers are simply opting for Intel in greater numbers, aided by Intel's massive marketing presence.

However, AMD is planning a marketing assault of its own for the Athlon. The brand name will be extended to reflect the different uses that AMD intends the chip to have. The 600MHz Athlon chips reviewed in this issue will remain the CPU for high-performance consumer and small-business PCs, with the Athlon Professional catering for the enterprise sector equivalents. The Athlon Select name will cater for budget machines and the Athlon Ultra will be found inside AMD-based servers and high-end workstations.

It's going to be an interesting time for processor technology. AMD is growing increasingly confident of being able to produce 1GHz copper-based processors by the end of the year. The company has invested heavily in the Athlon's future, including building a $1.9bn factory in Dresden which opens later this year. This should help it overcome the production difficulties that have dogged it in the past. Provided AMD has learnt from its other mistakes, the Athlon should prove to be the revitalising force that it needs.

Atlas Meridian K7-600

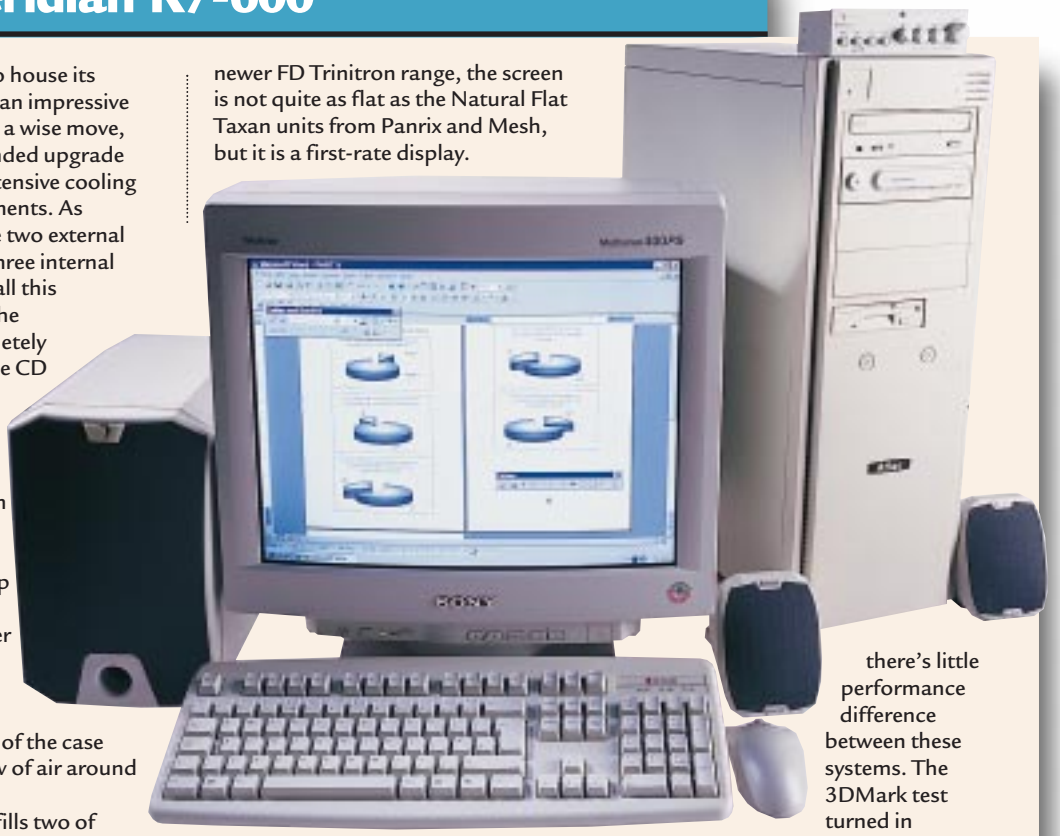
Atlas has chosen to house its Athlon PC inside an impressive full-tower case. This is a wise move, since it provides expanded upgrade potential as well as extensive cooling for the system components. As things stand, there are two external 5.25in bays free and three internal 3.5in bays. Even with all this expansion potential, the motherboard is completely unobstructed. Only the CD audio cable spoils the effect, being routed across the board rather than around it.

The 600MHz Athlon processor is housed in the familiar MSI motherboard. The chip is cooled by an active heatsink and the power supply fan that blows across its surface. There's a third fan located at the bottom of the case to ensure a steady flow of air around the system.

256Mb of SDRAM fills two of the three DIMM sockets on the motherboard, which should be more than enough memory to run any application well into the future. Like the Mesh offering in this test, Atlas has chosen the full SoundBlaster Live! card as the sound solution. This card offers excellent digital and wavetable effects, and has the added advantage of digital in and out ports for mastering to MiniDisc or DAT. A set of Diamond Pro Media 4030 speakers amplify the signal from the SoundBlaster – a decent speaker set with crisp and clear sound reproduction.

However, you won't be able to make use of the SoundBlaster's surround sound capabilities since there are only two satellites and a subwoofer in the set. Another pair of speakers can easily be added to rectify this.

A good monitor should be paramount when buying a PC, and the Sony Multiscan 400PS is a fine example of a 19in unit. Sony invented the aperture grille tube and makes some of the best CRT displays available. The 400PS produces a superb image with vivid and rich colours, while the screen is free from reflections. Since this is a standard Trinitron display rather than the newer FD Trinitron range, the screen is not quite as flat as the Natural Flat Taxan units from Panrix and Mesh, but it is a first-rate display.



Driving the Sony monitor is an Asus AGP graphics card using the nVidia Riva TNT2 chipset. This is a fast card in both 2D and 3D applications, with 32Mb of memory to help move those large textures around. It also has composite and S-Video TV outputs.

Yet again, IBM has proved to be the hard disk manufacturer of choice. This time, a 22Gb DeskStar EIDE unit has been fitted. As well as a substantial capacity, this unit boasts a 7200rpm spindle speed and GMR heads. An OnStream DI30 is provided for hard disk backup and security. The DI30 is an internal tape backup unit that has a native capacity of 15Gb and a compressed capacity of up to 30Gb.

Directly above the OnStream drive is a Hitachi GD2500 6X DVD-ROM drive. Even though not much is being released on DVD apart from movies, it's only a matter of time before CD-ROMs are abandoned, and a little future proofing is a good thing.

Lotus SmartSuite Millennium is bundled to get your office productivity off to a flying start.

The Atlas produced exactly the same SYSmark score as the Mesh – an impressive 255 – proving that there's little performance difference between these systems. The 3DMark test turned in Athlon-optimised scores of 5892 and 3974 at 1024x768 and 1280x1024 respectively, in 16bit colour mode. Again, these scores are impressive, but not as impressive as those from the Evesham.

Atlas has built a very strong system. Performance is good, the system case has masses of expandability, and the build quality is impressive. All the supporting components are high-quality, but it is the inclusion of the 30Gb OnStream tape backup device that makes the Atlas that little bit more special.

PCW DETAILS

Atlas Athlon 600
Price *£2,340.82 (£1,999 ex VAT)*
Supplier *Atlas 0181 532 6515*
www.atlasplc.com
Good Points *Full-tower case, excellent backup device*
Bad Points *3D performance could be better*
Conclusion *A thoughtfully built PC with some great components*

Build quality	★★★★
Performance	★★★★★
Value for money	★★★★
Overall	★★★★

Carrera Octane M600

The Carrera name has lately become synonymous with cutting edge technology and the Octane M600 strengthens its position. Like all the systems in this group test, the Carrera is based on a 600MHz AMD Athlon in an MSI motherboard. The processor is supported by 256Mb of PC100 SDRAM that fills two of the three DIMM slots. With this much memory, you shouldn't have any problem running software for quite a while.

Inside, things are pretty tidy, with no cables hindering access to the motherboard. Even the CD audio cable has been thoughtfully routed around the board to the sound card.

The EIDE controller on the motherboard supports the UDMA66 standard, so the 18Gb Western Digital Expert hard disk can be used to its full potential. Western Digital licenses the GMR head technology from IBM, so this drive shares the same impressive data density of the IBM range, as well as a 7,200rpm spindle speed.

The single AGP slot is filled by a 32Mb Maxi Gamer Xentor graphics card. Based on the nVidia Riva TNT2 Ultra chipset, this card produces very impressive performance in both 2D and 3D applications, making it ideal for both serious applications and heavy-duty gaming.

The LG Studioworks 910SC isn't the best 19in monitor available, but it's still a fine example of a shadow mask display. Even though the screen is more curved than the aperture grille monitors in this test, the focus is clear and the colours bright. Controlling the OSD is simple and intuitive, using the four buttons on the left of the front fascia, while the contrast and brightness controls are dealt with by independent analog wheels under the fascia.

Breaking with tradition, Carrera has opted for an Aureal Vortex 2 sound card instead of a Creative Labs SoundBlaster Live! But this is no bad thing, as the Vortex 2 is a great card with superb 3D effects for games. It also sports an optical digital output so you can master to MiniDisc or DAT.

A set of Altec Lansing ACS54 speakers complements the Vortex 2, comprising four satellites and one subwoofer. This package is aimed at much the same market as the Creative 4 Point Surround speakers, but overall sound quality is superior.

The last expansion card is a 56K PCI modem that's coupled with a year's free Internet access, so the system really is Internet-ready straight out of the box. That said, free Internet access is easy to come by these days, but it's still a bonus to have everything set up the minute you buy your PC.

Filling the top 5.25in drive bay is a Panasonic DVD-ROM drive with 6X and 32X performance for DVD and CD media respectively. Below this is an Iomega Zip 100 drive. Although 100Mb isn't a huge amount of space, the Zip is still a decent data transport device due to its high market penetration.

Lotus SmartSuite Millennium is the productivity bundle, and although it's not as popular a solution as Microsoft Office, it's still a very capable package.

A Key Tronic keyboard and a Microsoft Intellimouse make up the input devices, both being quality components. And rounding things off is a two year on-site warranty, adding piece of mind to an already impressive package.

Performance proved to be excellent, with the Carrera turning in a SYSmark score of 259, just one point behind the Panrix. Unlike the Panrix, however, 3D performance was superb, with 3DMark scores of 6506 at 1024x768 and 4349 at 1280 x1024, both in 16-bit colour.

Although it's not as feature-packed as the Mesh, the Octane M600 costs almost £300 less and actually performs slightly better. Ultimately, if you're after cutting edge technology at a bargain price, the Carrera is definitely worth investigating.

PCW DETAILS

Carrera Octane M600
Price *£2,055.07 (£1,749 ex VAT)*
Supplier *Carrera 0181 307 2800*
www.carrera.co.uk
Good Points *Great performance, excellent value*
Bad Points *Average monitor*
Conclusion *A value-packed, high-performance PC that can turn its hand to anything*

Build quality	★★★★★
Performance	★★★★★
Value for money	★★★★★
Overall	★★★★★

Evesham Vale Athlon 600

Evesham has thought long and hard about how to get the most out of the Athlon processor and this configuration shows it off well. Build quality is impressive. Cables have been grouped together and wrapped in a plastic cover to keep them out of the way, giving easy access to expansion slots, memory slots and the processor, and leaving room for air to circulate.

The MSI motherboard leaves plenty of room for upgrades with three PCI slots free and the two ISA slots unused. The 128Mb SDRAM module runs, in common with all the other manufacturers in this test, at 100MHz. The coming months should see the adoption of memory that will be able to take full advantage of the 200MHz Alpha-based system bus.

Removable storage is provided by a Castlewood ORB drive. This is a similar unit to the Iomega Jaz2 drive, although the capacity is slightly higher at 2.2Gb than the 2Gb on Iomega's unit. In the Orb's favour, the cartridge consists of a single disk platter, whereas the Jaz2 cartridges have two. The data density is higher and performance should subsequently be better. Unfortunately, the ORB is not a widely adopted standard like the Jaz and Jaz2. Evesham has broken ranks with the rest of the pack and installed a Maxtor hard disk instead of an IBM one. It's still an impressive drive although, with a capacity of 20Gb, it should be a fair while before you need to upgrade.

The final EIDE device is a Panasonic DVD-ROM drive. With 6x DVD performance and 32x CD-ROM capability, it should make short work of software installs.

The sound from the Creative Labs 4 Point Surround speakers could be clearer, but you do, after all, get four speakers and a subwoofer. Having said that, if you are short on space, a pair of better quality speakers may be more prudent.

The Key Tronic keyboard is ergonomically shaped. The bottom of the keyboard extends slightly to provide a handy rest for your hands and the top curves upwards. However, the keys are unusually stiff, which could become wearing.

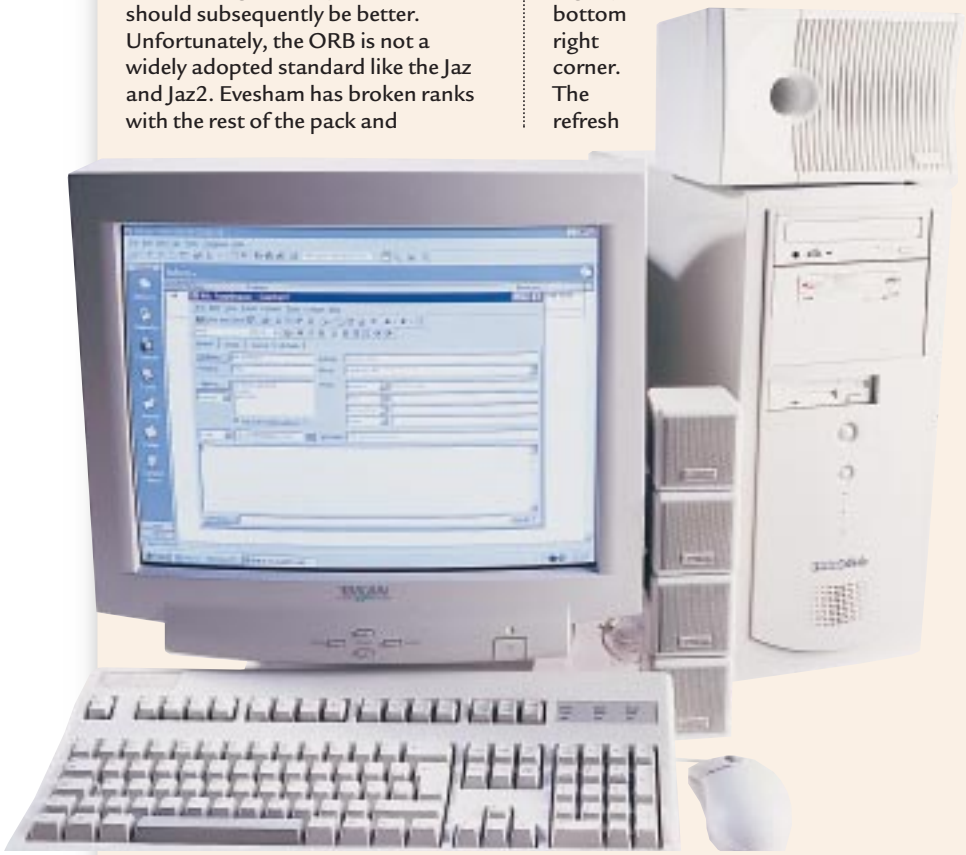
The 19in Taxan Ergovision 975 monitor is a good choice, although it does have some faults. This shadow mask unit is quite reflective but still displays colours vividly. No dark patches are evident and focus is generally sharp, but it does suffer slightly in the bottom right corner. The refresh rate is respectable – 85Hz at a resolution of 1280x1024, and even at 1600x1200 it doesn't give up displaying at 72Hz. A powered USB hub forms part of the base, allowing you to daisy chain USB devices.

A Diamond Supra Express V.90 modem makes the Evesham Internet-ready straight from the box.

We ran a few extra tests on this machine to see how software optimisation affected the Athlon's performance. Our 3DMark test was run with and without optimisation for the 19 new 3DNow! instructions. It had a great effect on this machine, increasing the score by 431 points at the standard resolution of 1024x768 in 16bit colour, although the performance benefit decreased as we increased the resolution and colour depth. The high scores were due not only to the Athlon's high clock speed, but to the fact that AMD has designed the chip specifically to improve floating-point performance, which is crucial in games. The excellent Xentor32 Ultra graphics card, based on the nVIDIA Riva TNT2 Ultra chipset, also helps. It has motion compensation for DVD playback, which works well, producing no dropped frames.

The SYSmark result was among the best we have ever seen, with improvements across both the office productivity and content creation parts of the tests.

Our pre-release version of the Evesham system was occasionally prone to instability, but this will be fixed by the time the machine is available to buy.



PCW DETAILS

Evesham
Price *£1,996.33 (£1,699 ex VAT)*
Contact *Evesham Vale 01386 769600*
www.evesham.com
Good Points *Blistering 3D performance*
Bad Points *Monitor could be better and ORB drive may be undesirable*
Conclusion *A well built, good value machine for someone who knows what they're doing*

Build quality	★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall	★★★★

Mesh Matrix 600D

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Like all the manufacturers in this group test, Mesh pulled out all the stops to show off AMD's new super chip. Beating at the heart of the 600D is, unsurprisingly, a 600MHz AMD Athlon processor. The motherboard is the same MSI model that all these machines sport, although this may differ in the production model. One of the three DIMM sockets is occupied by 128Mb of PC100 SDRAM, allowing a further 512Mb to be added.

Filling the single AGP slot is a 32Mb Matrox G400 graphics adaptor. This is a great 2D/3D card with dual monitor support. Unlike previous dual monitor graphics cards, the G400 supports multiple displays at different refresh rates, so if your second monitor is smaller than your primary unit, you won't have to run your main display at a low refresh rate. The G400 didn't perform as well as the TNT2 Ultra cards, but if Mesh had supplied the G400 Max the story could have been different.

Connected to the G400 is one of the best monitors we have seen, the Taxan Ergovision 980 TCO99. This 19in unit is based on Mitsubishi's Natural Flat Diamondtron tube and the image quality is nothing short of stunning. The focus is perfect across the whole screen surface and although there was a small colour registration problem, it was probably due to rough transit since a brief adjustment in the OSD rectified the situation. There's also a USB hub integrated into the monitor base for easy USB connection.

A full retail SoundBlaster Live! takes care of sound, coming complete with the digital connector daughter card. This adds SP/DIF in and out ports, as well as digital DIN in and out. This makes it an ideal for digital sound editing, since tracks can be copied to and from the PC without a loss of quality. Also, with MP3 becoming popular, it allows users to copy their MP3 files to MiniDisc for on-the-move listening. Unfortunately, the Creative PC Works 4 Point surround speakers aren't the best units around, although they will at least give a surround sound effect.

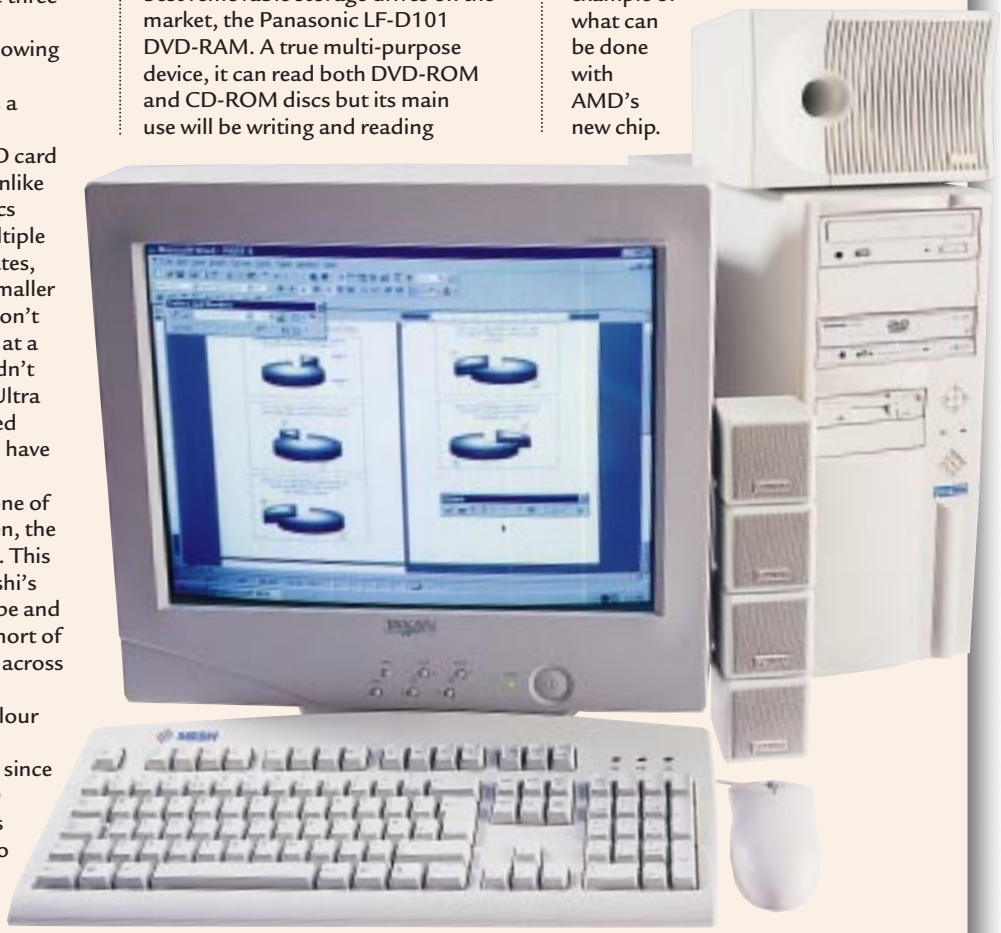
The other PCI card is a Diamond SupraExpress V.90 modem.

Storage is handled by a 7,200rpm IBM hard disk providing 22Gb, although a bit of disk partitioning would have made more efficient use of the space. That said, this is a fast and capacious drive that should keep almost anyone happy for some time to come. To supplement the hard disk, Mesh has installed one of the best removable storage drives on the market, the Panasonic LF-D101 DVD-RAM. A true multi-purpose device, it can read both DVD-ROM and CD-ROM discs but its main use will be writing and reading DVD-RAM discs. These can store up to 2.6Gb on each side – ideal for transporting large files or safeguarding important ones. Since the DVD-RAM drive is a SCSI device, Mesh has installed an ISA Adaptec 1520 SCSI card, which is fast enough to make the most of it. Strangely, there's also a DVD-ROM drive in the shape of a Pioneer DVD-113. Even though the DVD-RAM drive can read every type of media, Mesh felt the 6x DVD and 32x CD read was preferable to the 1x DVD and 20x CD performance of the RAM drive.

Corel WordPerfect Office 2000 is bundled with the system and there's a one year on-site warranty.

The Athlon lives up to its predicted high performance with a SYSmark score of 255. We received a patch for 3DMark with enhancements for the Athlon architecture. It did make a small difference, with the Mesh scoring 5,338 at 1,024x768 in 16bit colour compared to 5,262 without it.

The Mesh Matrix 600D is a fine example of what can be done with AMD's new chip.



PCW DETAILS

Mesh Matrix 600D
Price *£2,348.83 (£1,999 ex VAT)*
Supplier *Mesh 0208 208 4706*
www.meshplc.co.uk
Good Points *Superb monitor and great peripherals*
Bad Points *None*
Conclusion *An expertly built machine with a great monitor. A perfect example of an Athlon workstation*

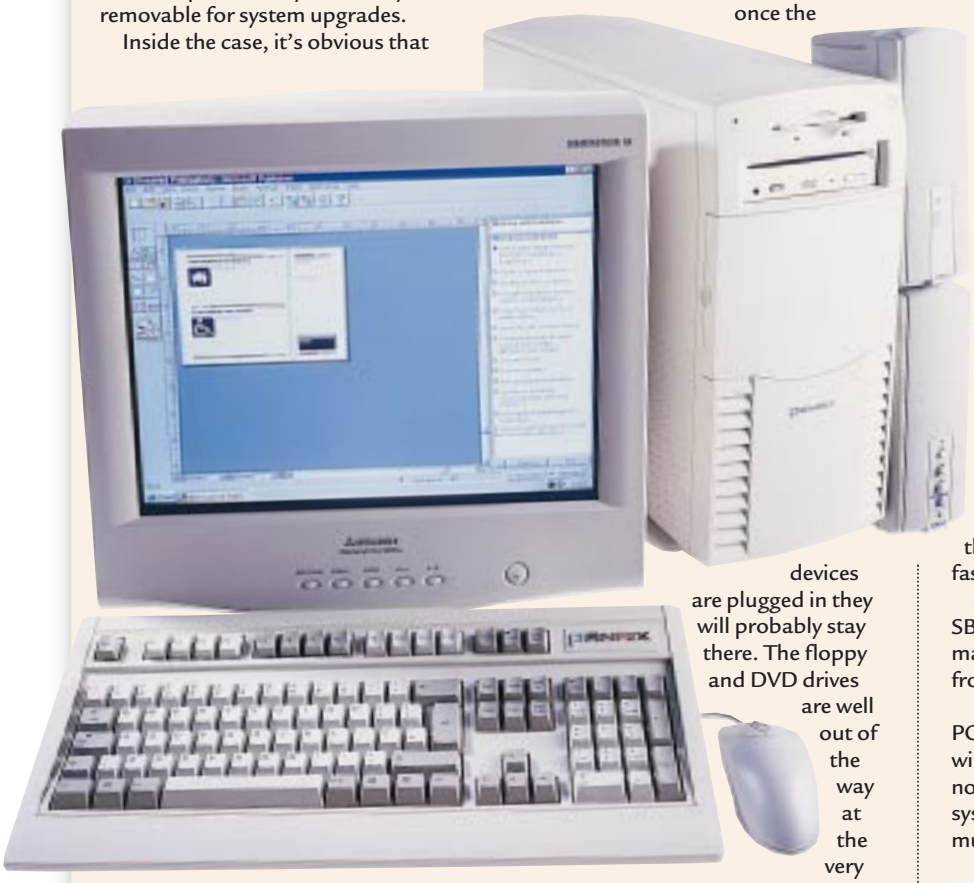
Build quality	★★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall	★★★★★

Panrix Magnum 600

This Panrix machine looks like a cross between a server and a desktop. The case is excellent. The rear is covered by a plastic flap that is easily removed via a single thumbscrew. Once the back cover is off, the side cover slips away easily without removing any more screws.

The internal Zip drive and two 5.25in expansion bays are covered by a double hinged door that folds flush against the side of the system case. The blanking plates for the free 5.25in expansion bays are easily removable for system upgrades.

Inside the case, it's obvious that system cooling is of paramount importance because there are four fans – the usual fan in the power supply, plus one directly underneath. A third sits at the base of the front of the machine and the CPU has a dedicated fan of its own. With this amount of air circulating, there's little danger of overheating.



Build quality is generally good, but is let down slightly by poor routing. The power cable for one of the fans is stretched from the socket on the far side of the motherboard across the processor itself, blocking the memory slots. It would have been better to route the cable round the side of the case. The rest of the cables are grouped together tidily enough, although not as tidily as others in this test. The motherboard is the same MSI model as the rest of these machines, as it was the first Slot A board available. Slot A shares a similar form factor with the Intel Slot 1 standard, but the two are not interchangeable.

The two PS/2 ports feel insecure, wobbling as if they will not stand up to much abuse, although once the devices are plugged in they will probably stay there. The floppy and DVD drives are well out of the way at the very top of the case, making it easy to install devices in the free bays. The AOpen 6x DVD drive sports a slot loading mechanism rather than a tray. DVD movies play with no dropped frames, although we think the Matrox DVD player could be more user-friendly. The SoundBlaster Live! Value is a good card but lacks digital ports, while the Yamaha YST-M20 speakers are high quality but there's no subwoofer or surround option.

The 22Gb IBM Deskstar drive makes another appearance, providing more than enough space to store Internet downloads via the Diamond SupraExpress V.90 modem.

The monitor is a good choice. The aperture grille Mitsubishi Diamond Pro 900u is based on the same 19in Natural Flat tube as the Taxan supplied with the Mesh PC. The display is excellent, apart from a slightly dark patch at the bottom right on our review model. The cables are sufficiently recessed for the monitor to be placed flush against the wall. At the rear, you'll find USB ports, along with D-SUB and BNC connectors. A handy button allows you to switch between D-SUB and BNC with one touch. The rest of the controls are not so user-friendly, with the menu system being quite tricky to navigate although all the options you would expect from a high-end monitor are present.

The most disappointing aspect of this machine is the graphics card. Panrix has installed a Matrox G400, but only opted for the 16Mb version which appears somewhat outclassed by the 32Mb competition. When tested under 3DMark, the Panrix just couldn't compete with the better specified rival cards. However, the SYSmark score of 260 was the fastest on test.

A copy of Microsoft Office 2000 SBE adds a fair amount of value and makes the Panrix a productive tool from the outset.

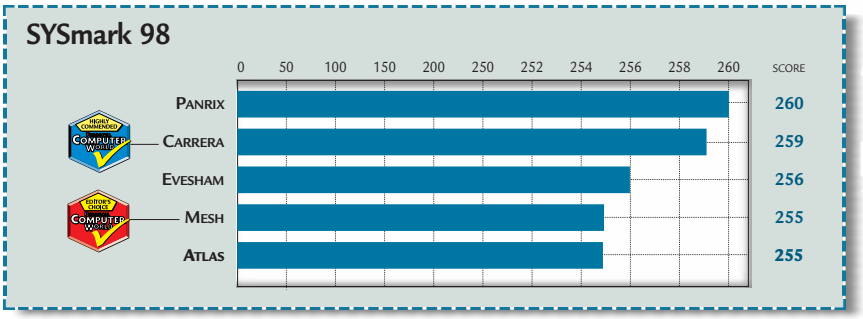
On the whole, however, the Panrix PC is a little disappointing compared with the competition. There's nothing intrinsically wrong with this system, but it doesn't offer quite as much as the other units on test.

PCW DETAILS

Panrix
Price *£2,344.13 (£1,995 ex VAT)*
Contact *Panrix 0113 244 4958*
www.panrix.com
Good Points *Good software bundle*
Bad points *Should have opted for a better Matrox graphics card*
Conclusion *A good, generally well built machine, but Panrix has not used the Athlon to its full potential*

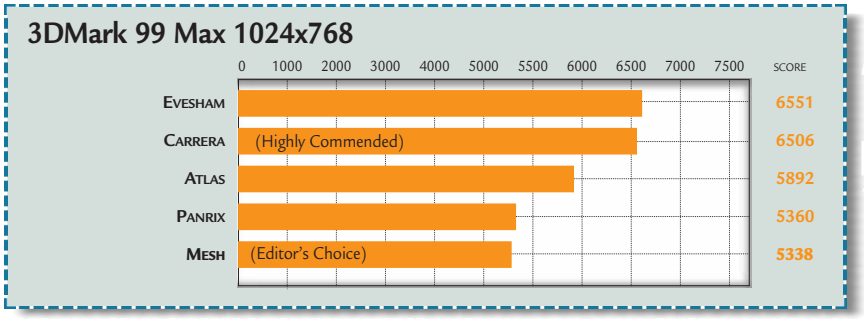
Build quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall	★★★★

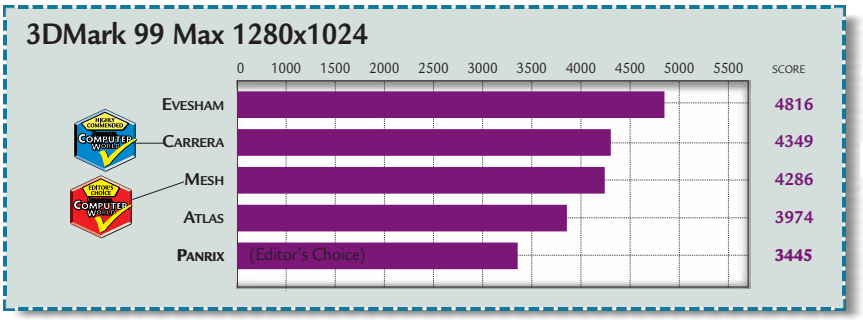
PCW Labs report



All of these results are within the margins of error set by Bapco, so the difference between the machines is of little consequence. This is not surprising, given that all the machines had exactly the same processor and motherboard. What these results do show, however, is the large perfomance boost that the Athlon has delivered across the board.

AMD's claim that the Athlon improves 3D perfromance is certainly borne out by these results. The TNT2 Ultra based cards in the Evesham and Carrera machines have particularly benefited from the Athlon processor, showing what can be achieved when a good graphics card is married with a fast chip designed with 3D perfomance in mind.





We really wanted to put the Athlon through its paces, so we increased the resolution to see whether the processor could reproduce the same fast results at a higher setting. We were not disappointed. The results demonstrate that these latest machines can certainly keep up with the extra demands posed by this higher display mode.

How we did the tests

● **SYSmark** measures the time it takes the PC to perform a variety of tasks in 14 common office and content creation applications. Each test is run three times to ensure consistent results. The applications are:
Office productivity: CorelDraw 8, Microsoft Excel 97, Dragon Systems NaturallySpeaking 2.02, Netscape Communicator 4.05 Standard Edition, Caere OmniPage Pro 8.0, Corel Paradox 8, Microsoft PowerPoint 97, Word 97.
Content creation: MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Adobe Photoshop 4.01, Adobe Premiere 4.2, Xing Technology XingMPEG Encoder 2.1.

Performance depends on processor speed, RAM, graphics card and disk I/O. As the software packages are widely available, the scores reflect how the PC will perform in a real-world situation.

● **3DMark99 Max** is an instruction set-optimised version of 3DMark99 from Futuremark Corporation, which tests the machines' 3D capabilities. When applicable, the suite of tests will draw upon AMD's 3DNow! or Intel's KNI instruction sets. A Real World DirectX 6.1 3D games engine is used to produce one result from a balanced testing methodology that includes image quality, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping.

All 3DMark99 Max benchtests are performed at a resolution of 1024x768 in 16bit colour depth, with the test suites set to loop three times. For this particular group test we also ran an additional benchtest at a resolution of 1280x1024 in 16bit colour. As with the SYSmark results, the higher the score, the better the result. However, due to the implementation of instruction set optimisation, no comparison can be made between the results from the original 3DMark99 and the Max version.

More details at www.bapco.com and www.3dmark.com

Table of features



Manufacturer	Atlas	Carrera	EveshamVale	MESH	PANRIX
Model Name	**Meridian K7-600**	**Octane M600**	**Athlon 600**	**Matrix 600D**	**Magnum 600**
Price (exc VAT)	£1,999	£1,749	£1,699	£1,999	£1,995
Price (inc VAT)	£2,348.83	£2,055.08	£1,996.33	£2,348.83	£2,344.13
Telephone	07000 285 275	0181 307 2800	01386 769600	0181 208 4706	0113 244 4958
URL	www.atlasplc.com	www.carrera.co.uk	www.evesham.com	www.meshplc.co.uk	www.panrix.com
Hardware Specs					
Processor	AMD Athlon 600 MHz	AMD Athlon 600MHz	AMD Athlon 600MHz	AMD Athlon 600MHz	AMD Athlon 600MHz
RAM/type	256Mb/SDRAM	256Mb/SDRAM	128Mb/SDRAM	128Mb/SDRAM PC100	128MB/SDRAM
Full RAM slots/spare RAM slots	2/1	2/3	1/2	1/2	1/3
Max memory in this configuration	512Mb	512Mb	640Mb	640Mb	640Mb
Max memory supported	768Mb	768Mb	768Mb	768Mb	768Mb
Hard disk manufacturer + model	IBM Deskstar	W D Expert	Maxtor 5120	IBM Deskstar	IBM Deskstar
Hard disk size/interface	22Gb/EIDE	18Gb/EIDE	20Gb/EIDE	22Gb/EIDE	22Gb/EIDE
Storage drive model + manufacturer	ADR Onstream	Iomega Zip	Castlewood ORB	Panasonic LF-D101E	Iomega Zip
Size of storage drive media	30Gb	100Mb	2.2Gb	2.6Gb single/5.2Gb double	100Mb
Storage drive interface	EIDE	EIDE	EIDE	SCSI	EIDE
Motherboard Components					
Motherboard manufacturer	MSI	MSI	MSI	MSI	MSI
L2 cache	512K	512K	512K	512K	512K
Expansion and I/O					
No of 3.5/5.25in bays	5/4	3/4	3/3	2/3	1/3
No of free 3.5/5.25in bays	3/2	1/2	1/1	3/1	0/2
No of PCI/ISA/shared slots	5/2/1	4/1/1	5/2/1	3/2/1	5/2/1
No of free PCI/ISA/shared slots	3/2/1	2/1/1	3/2/1	1/2/0	2/2/1
No of USB/serial/parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/1/1/2
Multimedia					
CD-ROM manufacturer + model	Hitachi GD2500	Panasonic 8583B	Panasonic SR-8584	Pioneer DVD-113	AOpen DVD 9632
CD-ROM speed/interface	6x DVD; 24x CD/EIDE	6x DVD; 32x CD/EIDE	6x DVD; 32x CD/EIDE	6x DVD; 32x CD/EIDE	6x DVD; 32x CD/EIDE
Sound card manufacturer	Creative	Aureal	Creative	Creative	Creative
Sound card model	SoundBlaster Live!	Vortex 2	SoundBlaster Live! Value	SoundBlaster Live!	SoundBlaster Live! Value
Speakers manufacturer + model	Diamond Pro Media 4030	Altec Lansig AC554	PC Works 4 Point Surround	PC Works 4 Point Surround	Yamaha M20
Graphics card manufacturer + model	Asus V3800	Xentor 32 Ultra	Xentor32 Ultra	Matrox G400	Matrox G400
Chipset	Nvidia Riva TNT2	Nvidia Riva TNT2 Ultra	Nvidia Riva TNT2 Ultra	MGAG400	MGAG400
RAM/max RAM/type	32Mb/32Mb/SDRAM	32Mb/32Mb/SDRAM	32Mb/32Mb/ SDRAM	32Mb/32Mb/SDRAM	16Mb/16Mb/SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor manufacturer + model	Sony Multiscan 400PS	LG Studioworks 910SC	Taxan Ergovision 975	Taxan Ergovision 980	Mitsubishi Diamond 900u
Monitor size/max viewable diagonal	19in/18in	19in/18in	19in/18in	19in/18in	19in/18in
Max refresh rate at 1024x768	85Hz	120Hz	117Hz	133Hz	90Hz
Max refresh rate at 1280x1,024	85Hz	85Hz	88Hz	100Hz	85Hz
Max refresh rate at 1600x1,200	75Hz	75Hz	75Hz	85Hz	75Hz
Other Information					
Modem manufacturer + model	Accord 56K	E-Tech 56K	Diamond Supra Express 56i	Diamond Supra Express 56i	Diamond Supra Express 56i
Highest supported modem standard	V.90	V.90	V.90	V.90	V.90
Misc hardware	None	Headset	none	Adaptec 1520 SCSI Controller	none
Bundled software	Lotus SmartSuite Millennium	Lotus SmartSuite Millennium	none	WordPerfect Office 2000	MS Office 2000
Standard warranty	1 year on-site	2 years on-site	2 years on-site	1 year on-site UK only	1 year on-site
Warranty options	3 years on-site	3 years on-site	3 years on-site	3 years on-site	3 years on-site
Technical support tel no	07000 285275	0181 307 2830	0800 496 4636	0181 208 4795	0113 244 4948
Technical support hours	Mon-Fri 9am-5.30 pm	Mon-Fri 9am-6pm	Mon-Sat 9am-5.30pm	Mon-Fri 9am-6pm	Mon-Fri 9.30-5.30 Sat 10-4

Editor's Choice

It wasn't easy picking a winner, since we'd have been happy with any of the systems supplied. All the manufacturers pulled out all the stops to produce cutting edge machines based on AMD's new wonder-chip. And if this test has proved anything, it's that the AMD Athlon is going to be a force to be reckoned with. It's a faster CPU than Intel's 600MHz Pentium III and it costs less.

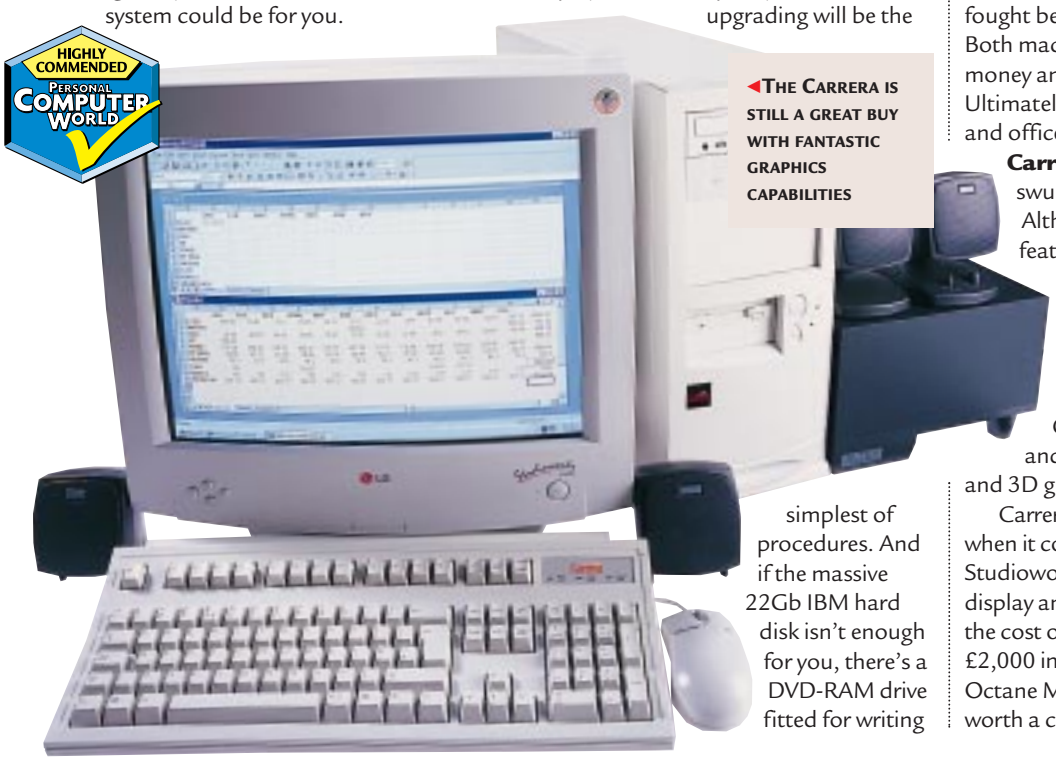
Of course, as with all technological advances, the extra features sported by the Athlon are only of any use if software developers make use of them. Unfortunately, there's no software that makes use of the Athlon's third FPU as yet, but when optimised code does start to appear, we should see even better performance from this chip.

It was refreshing to see all the manufacturers in this test surround the new CPU with high-quality supporting components, and build quality across the board was very impressive. Few compromises were made by any of the vendors and the prices weren't as high as we'd expected. If you're happy to forsake the Intel Inside logo on your PC, an Athlon-based system could be for you.

THE MESH MATRIX 600D, WITH ITS NEAR-FLAWLESS MONITOR, MAKES THE TOP OF THE CROP

Editor's Choice goes to the **Mesh Matrix 600D**. Mesh put together a truly staggering system with just about every base covered. The Taxan Ergovision 980 monitor is superb, while the 32Mb Matrox Millennium G400 graphics card offered the option of adding a second display. The build quality is excellent, so upgrading will be the simplest of procedures. And if the massive 22Gb IBM hard disk isn't enough for you, there's a DVD-RAM drive fitted for writing to 5.2Gb removable optical discs.

Mesh has thought long and hard about this machine and come up trumps. If you're looking for the ultimate AMD Athlon-based system, this is it.



THE CARRERA IS STILL A GREAT BUY WITH FANTASTIC GRAPHICS CAPABILITIES

The battle for our Highly Commended award was closely fought between Carrera and Evesham. Both machines offered superb value for money and impressive performance. Ultimately, though, the extra memory and office suite supplied with the **Carrera Octane M600** just about swung the balance in its favour.

Although the Octane isn't as fully featured as the Mesh Matrix 600D, it's still a great system. With 256Mb of RAM supporting the CPU, you won't need to upgrade for a long time. Add to this the excellent Maxi Gamer Xentor graphics card, and you have incredibly fast 2D and 3D graphical performance.

Carrera hasn't pushed the boat out when it comes to its monitor, but the LG Studioworks 910SC is still a fine 19in display and its inclusion has helped keep the cost of the system down. At just over £2,000 including VAT, the Carrera Octane M600 is a great buy and well worth a close look.

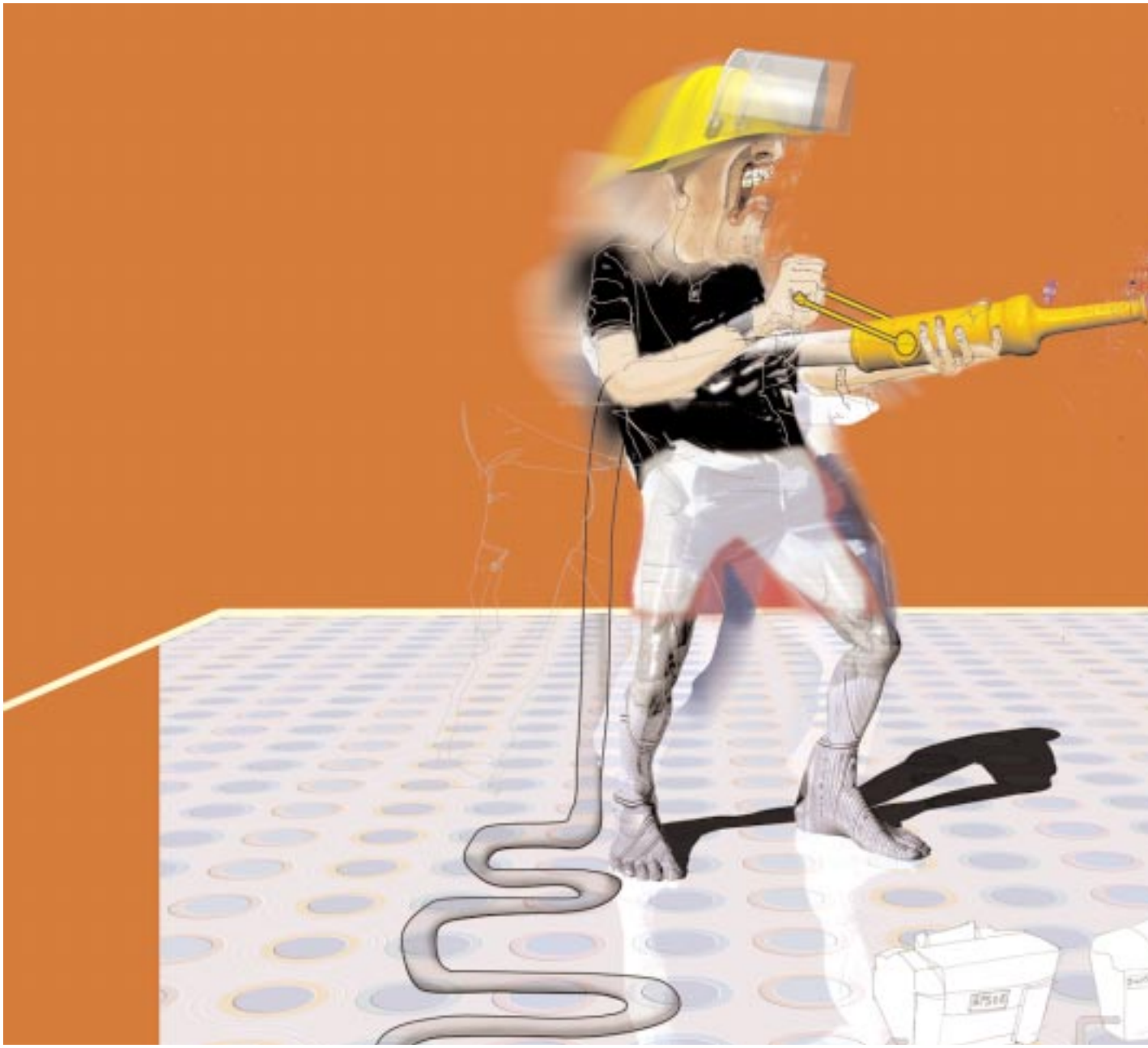


Photo Finish

Twelve of the best photo-capable printers, from budget to high-end, strike a pose for our team of testers.

If your inkjet printer is more than a couple of years old, it could be worthwhile upgrading. While the twelve printers we have included in this group test still rely on tried and tested thermal or piezo-electric heads, the technology behind them has moved on in leaps and bounds.

Not only are modern printers faster than ever before, but they also place much finer drops of ink on the page, which results in far more realistic photo reproduction. To prove the point, Lexmark and Epson have both sponsored photography exhibitions in recent years in which the exhibits were produced on their own printers. Indeed, Lexmark's latest line is endorsed by David Bailey.

But it's not only inkdrop sizes that are shrinking — prices are getting smaller too, and now it's easy to find yourself a photo-capable printer for around £150. Here, we take an in-depth look at a dozen of the latest to hit the shelves in the budget, photo printing and office printing markets, running them through a variety of tests to discover which is the best for you.

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Contents

• *Reviews: Nik Rawlinson*
• *Testing: David Eade, Matthew Howard*

Canon BJC-1000

BUDGET

The BJC-1000 holds only one CMY cartridge, and the black cartridge is an optional extra, so to get a true measurement of how this printer performs in its pure 'vanilla' configuration, we tested its text output using composite black. Although there was a lot of feathering at standard resolution on photocopy paper, it looked as though we had used a black cartridge; and when we switched to inkjet paper, the characters were crisp and dark.

The BJC-1000 won't clutter your desk, but you will have to clear a space for the print-outs — there is no output tray, so they arrive on the desk. Installation started off well, but the routine refused to recognise that we were using the correct installation CD. Once we had convinced it that we were, set-up continued. The driver is easy to use: you select the type of document being printed, and it will change the cartridge and media information itself. This can be fine-tuned using drop-down menus. Colours were vivid on Canon's inkjet paper, but on photo paper the photograph was rather grainy. That said, the photo's fades were smooth, colours didn't run into each other and skin tones were good, but on photocopy paper the Best quality composite black text was highly feathered.

PCW DETAILS

★★★

Price *£104.58 (£89 ex VAT)*
Contact *Canon 0121 666 6262 www.canon.co.uk*
Good Points *Good colours on inkjet paper*
Bad Points *Highly feathered text on photocopy paper*
Conclusion *The lack of a black cartridge was disappointing*

Epson Stylus Color 440

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

BUDGET

Installing this two-cartridge printer from the driver CD was simple. The comprehensive driver gave easy access to head alignment and nozzle cleaning from the software. It lets you select paper types using drop-down menus, and it will change the quality settings available. Reduction and enlargement of between 10 per cent and 400 per cent is possible. Best and Standard quality text on photocopy paper was too feathered to send out as a business letter. On inkjet paper, though, the 440 really came through. Text was crisp and dark, with even 4pt text being easily legible. We were impressed with its photo quality output on Epson's own photo paper. But although colours were vivid, the output was a little grainy. On the positive side, skin tones were realistic and fades were smooth and uniform, and our business graphics looked great on inkjet paper, easily rivalling some of the business printers in this group test, and we would not have been shy to use photocopy paper to print them, either, as colours remained bright and of uniform density. The 440 is not the fastest kid on the block, but when printing text it beats everything seen here from Canon. When printing the CorelDraw business graphics it also beats HP's budget offering [*below*], shaving almost five minutes off the job completion time.

PCW DETAILS

★★★★★

Price *£99.01 (£84.26 ex VAT)*
Contact *Epson 0800 220546 www.epson.co.uk*
Good Points *Excellent inkjet paper peformance*
Bad Points *Text feathering on photocopy paper in Best quality*
Conclusion *Our budget pick of the bunch*

HP DeskJet 610C

BUDGET

HP printers are always a dream to set up, and this entry-level replacement for the DeskJet 420C is no exception. A Getting Started poster showed us exactly how to install the cables, drivers and cartridges. The 610C is a two-cartridge printer that even has support for the euro symbol under DOS. The driver is easy to use, with drop-down menus for paper size and type, and selection buttons with illustrative icons for selecting the print quality.

Printer services such as alignment and head cleaning can also be found in the driver, and the front loading and catching input and output paper trays hold 100 and 50 pages respectively. In common with the other HP devices tested here, the 610C's paper path is as far from straight as you can get. Standard quality text on photocopy paper was excellent. Feathering was minimal, and in a business environment we would have had no hesitation in sending out our print. Even the draft text impressed, although in some places larger fonts suffered from slight alignment problems. The inkjet paper Best quality colours of our CorelDraw test were not as good as those produced by the Epson 440 and we were very disappointed with the grainy, dark photo that suffered badly at the hands of the 610C's relatively low 600x600 resolution. Even PhotoREt couldn't save it.

PCW DETAILS

★★★★

Price *£79 (£67.23 ex VAT)*
Contact *Hewlett-Packard 0990 474747 www.hp.com*
Good Points *Euro support under DOS. Good text output*
Bad Points *Poor-quality photo reproduction*
Conclusion *If all you want to print is text, this is a good choice*

Lexmark Z11

BUDGET

The Z11 squeezes 1200x1200 dots into every square inch. It's easy to install and its driver is simple to use: paper sizes are represented by icons, and a series of selection buttons specify paper types. Ink levels are displayed on-screen. It printed our business letter in composite black, as it came with a colour cartridge only, and the output suffered from multi-coloured feathering at draft and standard resolutions, even on inkjet paper. Feathering was particularly bad at standard resolution on photocopy paper. This problem was eliminated when switching to Best quality and using inkjet paper, but on all occasions it was unable to print a greyscale signature at the foot of the letter without shading the area with cyan spots. On inkjet paper, our business graphics were handled well. Graduated fades were only slightly stepped, and solid blocks of colour were well reproduced. At Best quality and on photo paper the A4 photograph was fairly good: banded, but impressive considering the price. In terms of speed, the Z11 performed on a par with Canon's BJC-1000, but it was well beaten by HP's 610C and the Epson 440 when printing text at Best quality. The 440 completed the high-quality business graphics in around a third of the Z11's time.

PCW DETAILS

★★★

Price *£117.50 (£100 ex VAT)*
Contact *Lexmark 01628 481500*
www.lexmark.co.uk
Good Points *Ink level monitor in driver*
Bad Points *Difficulty printing greyscale bitmap*
Conclusion *1200 x 1200dpi sounds good, but the Z11 didn't live up to our expectations*

Canon BJC-6000

SMALL BUSINESS

Installation of the BJC-6000 involved navigating a confusing series of CD subdirectories, but the fact that each of the printer's four base colours (CMYK) has its own individually replaceable inkwell is a welcome feature. Advanced driver options let you choose print quality, CMYK levels, colour intensity and four levels of brightness, and you can apply a range of stamps (watermarks) to your output. The 6000 uses Canon's new drop modulation technology to vary not only the colour but also the size of each dot laid down on the page. Canon claims that this produces deeper colours, more subtle shadows and less grainy images, and to an extent, it paid off. We were impressed by the quality of the photo, but the individual drops of ink were nonetheless evident. On Canon's inkjet paper the CorelDraw graphics reproduced well at Best quality. Colours were vibrant, and graduated fades were fairly smooth with only minimal stepping. Best, Standard and even Draft quality text on photocopy paper was excellent — dark and not at all feathered. While the BJC-6000 produced Standard quality text pages at about the same speed as the Epson 900, it was almost 10 times slower at Best quality. It was also around three times slower than the HP DeskJet 895Cxi at high-quality business graphics and photo printing.

PCW DETAILS

★★★★

Price *£233.83 (£199 ex VAT)*
Contact *Canon 0121 666 6262*
www.canon.co.uk
Good Points *Good business graphics. Excellent text on photocopy paper. Individually replaceable inkwells*
Bad Points *Slow*
Conclusion *A competent printer, let down by its ponderous approach*

Epson Stylus Color 900

SMALL BUSINESS

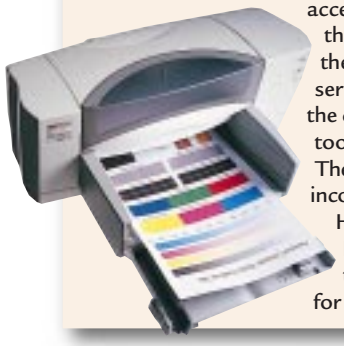
The Stylus Color 900 is Epson's high-end business offering. For networked users, the 900N includes a 100Base Tx Ethernet interface. There are drivers for iMac and G3 as well as Windows, but nothing for DOS users, unfortunately. As well as the usual paper size and type settings, the driver lets you add watermarks along the lines of 'confidential' and 'draft', reduce and enlarge on a 10 per cent – 400 per cent scale, and use PhotoEnhance3 to alter pictures or give them a sepia tone. While Lexmark claims to have the world's highest-resolution printer, Epson claims the 900 to have the world's smallest drop size at just 3 picolitres, and its 1440x720 top resolution is enhanced by Variable-Sized Droplet Technology which allows the printer to use any one of six drop sizes to improve output. Our photo, although slightly banded, benefited from this, with very fine print and almost no graininess. Clouds that should have come out white appeared a little pink, but skin tones were excellent, colours vivid and fades exceptionally smooth. Black text on photocopy paper in both Standard and Draft mode was a little feathered, but upping the quality to Best and using inkjet paper solved this. The 900 was fairly fast, too: printing text at this resolution, it was beaten only by HP's DeskJets 895CXi and 880C, and it was the fastest of the lot for photos and business graphics.

PCW DETAILS

★★★★

Price *£351.33 (£299 ex VAT)*
Contact *Epson 0800 220546*
www.epson.co.uk
Good Points *Fast business graphics and photos*
Bad Points *Slight banding on photo.*
Conclusion *An impressive performance*

HP DeskJet 895CXi



Installation of the 895CXi is a dream. The CD auto-runs and installation is complete with just a single click of the mouse. The driver has selection buttons for output quality and drop-down menus for paper size and type. Head alignment and cleaning is easily accessed through the printer services tab or the desktop toolbox. The 895CXi incorporates HP's PhotoREt technology for improved picture handling, and this paid off when it came to printing our photo. On HP's photo paper and at Best quality, banding was very difficult to spot, and we had to look closely to see any at all. Skin tones were excellent, and the colours of our images overall were hard to fault. HP printers excel when it comes to printing black text on photocopy paper. At standard quality we could see no feathering, and even text as small as 4pt was clearly legible. We also noted that while the 895CXi failed to draw a white hairline through a block of solid black ink when set to Best quality and using HP's own inkjet paper, it succeeded when we switched to photocopy paper. It also excelled when it came to handling Best quality text output, producing five pages in just 2min 37sec. Although beaten by the Epson 900, it came a close runner-up in printing the A4 photo at Best quality.

SMALL BUSINESS

PCW DETAILS

★★★★★

Price *£229 (£194.89 ex VAT)*
Contact *Hewlett-Packard 0990 474747 www.hp.com*
Good Points *Fast. Good business graphics. Excellent text on photocopy paper*
Bad Points *None to speak of*
Conclusion *A first-rate business printer*

Xerox Docuprint C15

The C15's installation procedure is rather fiddly — the user has to navigate a series of directories that had even us confused the first time around. The driver is quite basic , consisting of only one page and an 'about' tab. There are the usual drop-down quality and media selection menus, but no cartridge utilities. Like the Lexmark Z11, the C15 boasts an impressive 1200x 1200dpi. Even so, we were very disappointed with the quality of the photo it produced. On photo paper at the highest resolution it was grainy and a little banded, and blurred in some places. Where there were sharp changes of colour, a visible ridge appeared. Standard quality text on photocopy paper was fairly good, with no feathering. Characters were crisp and dark, and text as small as 4pt was easily legible. Business graphics were also handled well. Graduated fades were smooth, and solid colour blocks had accurate tones. Our black hairline came out red, though, showing that this printer had opted for composite black rather than using its black cartridge. We were fairly impressed when it came to speed. The C15 beat everything in its category apart from HP's 895CXi, dropping five pages of high-quality black text in 3min 20sec. It did less well, though, when it came to business graphics and the photo, managing to beat only the Canon BJC-6000 on both counts.

SMALL BUSINESS

PCW DETAILS

★★★

Price *£257.33 (£219 ex VAT)*
Contact *Xerox 0800 787787 www.xerox.com*
Good Points *Crisp text on photocopy paper*
Bad Points *Poor photo printing*
Conclusion *Xerox has a good reputation that this printer does not enhance*

Canon BJC-7100

The BJC-7100 is the first seven colour printer, sporting CMY, light CMY and black inks. The driver is comprehensive and easy to use. Scaling is possible on a range starting at 10 per cent and topping off at 400 per cent, and the features tab includes options for applying watermarks to the finished page. The 7100 incorporates Canon's P-POP (Plain Paper Optimised Printing) technology, so we were keen to find out how it would perform on photocopy paper: we can report that it did very well in our tests. Standard quality black text was clean, sharp, dense and not at all feathered. In draft mode it experienced some alignment problems, but 4pt text remained clearly legible. Business graphics reproduced particularly well on photocopy paper, and although colours were brighter on inkjet paper, we didn't really feel that it was worth the extra expense with such good photocopy paper results. However, in every instance the 7100 was by far the slowest printer in this category, taking over half an hour to print just five high-quality pages of text. Even reducing the quality setting to Standard only shaved off a paltry 10min from the job completion time. While the printer did well to output the Standard quality CorelDraw business graphics in a fraction under 2min, we had to wait over 9min when upping the quality to Best.

PHOTO

PCW DETAILS

★★★

Price *£292.58 (£249 ex VAT)*
Contact *Canon 0121 666 6262 www.canon.co.uk*
Good Points *Good business graphics, especially on photocopy paper*
Bad Points *Let down by its speed*
Conclusion *We'd be tempted if it was a bit quicker*

Epson Stylus Photo 750

EDITOR'S CHOICE Personal Computer World

The 750 is very easy to set up, requiring only a single reboot and a bit of patience while it goes through a head-cleaning process. The colour cartridge is a five-colour unit (CMY, half cyan, half magenta.) The driver uses drop-down menus to select paper types, and your selection will determine the quality options open to you. It also includes options for photo enhancement, image scaling and 180 degree rotation. We were not particularly impressed with the quality of Standard black text on photocopy paper, as feathering was clearly evident. At Best quality and on photo paper, the results of our photo printing test were excellent. Skin tones were realistic, there was no evidence of banding or graininess, and transitions from one shade to another were smooth. In short, we were unable to find a fault. We have criticised Epson printers in the past for being slow, but not this time. Five pages of Best quality text arrived in a tenth of the time taken by Canon's ponderous 7100, and the only printer in this category to beat it in the photo printing race is HP's DeskJet 880C. It also streaks ahead in the business graphics test, dropping the completed highest-quality page in just 1min 24sec.

PHOTO

PCW DETAILS

★★★★★

Price *£239 (£203.40 ex VAT)*
Contact *Epson 0800 220546 www.epson.co.uk*
Good Points *Excellent photo reproduction*
Bad Points *Poor black text on photocopy paper*
Conclusion *Number one for photo printing*

HP DeskJet 880C

Like all Hewlett-Packard printers, the DeskJet 880C is exceptionally easy to install. The driver has selection buttons for quality settings, and drop-down menus for paper size and type. A second tab includes options for two-sided printing and image orientation, while the Printer Services tab lets you clean and align your head without getting your fingers grubby. All of the HP printers tested here smoothed the edges of some jagged, non-scalable characters on our business letter, giving the page a more professional image. Draft quality text on photocopy paper, which was dark and showed no evidence of feathering, was almost good enough to use in a business situation. Standard quality business graphics on photocopy paper were also excellent, with some of the smoothest fades we have seen in graduated stripes, and a clean, white hairline running through the block of black. We were surprised that our business graphics actually looked better on photocopy paper than on HP's inkjet paper. On photo paper and at Best quality, our photo looked great. Colours were bright and vivid, the only problem being that skin tones came out rather dark.
The 880C bundle includes instant delivery software that will schedule the direct printing of internet material.

PHOTO

PCW DETAILS

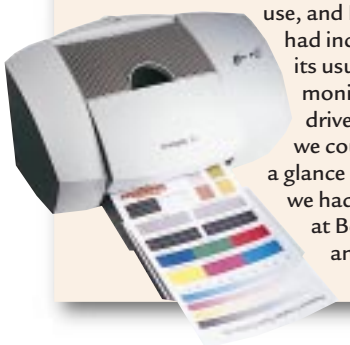
★★★★

Price *£199 (£169.36 ex VAT)*
Contact *Hewlett-Packard 0990 474747 www.hp.com*
Good Points *Smoothing of non-scalable characters. Good draft text on photocopy paper*
Bad Points *None to speak of*
Conclusion *A well-built, sturdy and versatile photo printer*

Lexmark Z51

HIGHLY COMMENDED Personal Computer World

The Z51 is the new feather in Lexmark's cap. At 1200x1200dpi it's the world's highest-resolution printer, and the company is promoting it in both the office and photo markets. Although installation was easy to follow, it did require two reboots. But we found the Z51 particularly easy to use, and Lexmark had incorporated its usual ink monitor into the driver so that we could see at a glance how much we had left. Even at Best quality and on Lexmark's own inkjet paper, the cyan block in our business graphics test was a definite grey/blue. It had no problem drawing a white hairline through the solid block of black, and graduated fades were very smooth with hardly any stepping. The Z51's high resolution certainly paid off when it came to printing our photo. On Lexmark photo paper and at the highest quality setting, it demonstrated almost continuous tone with no grain and bright, vivid colours. Skin tones were realistic, there was no banding, and dark tones did not bleed into lighter ones. Plain text on photocopy paper was not in the least bit feathered, and at Standard quality even 4pt text was clearly legible. In terms of speed the Z51 was no slouch, easily beating the Canon BJC-7100 at high-quality text printing, but losing out to Epson's 750 when it came to high-quality photos and business graphics.



PHOTO

PCW DETAILS

★★★★

Price *£211.50 (£180 ex VAT)*
Contact *Lexmark 01628 481500 www.lexmark.co.uk*
Good Points *Fairly fast. Good photo printing. Almost no ink fade in sunny windows*
Bad Points *Slight mis-matching of business graphics colours*
Conclusion *A quality product worthy of consideration*

PHOTO SAMPLES

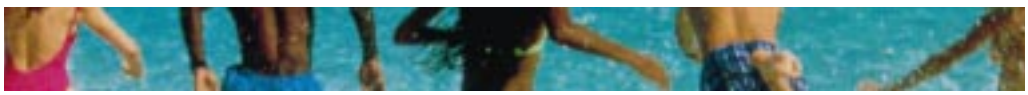
BUDGET

Canon BJC-1000

Epson Stylus Color 440

HP DeskJet 610C

Lexmark Z11



SMALL BUSINESS

Canon BJC-6000

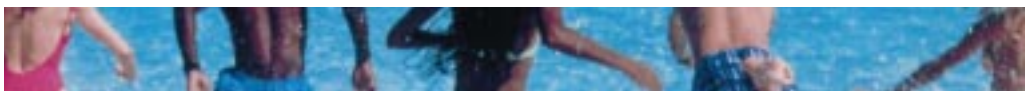
Epson Stylus Color 900

HP DeskJet 895CXi

Xerox Docuprint C15

PHOTO

Canon BJC-7100

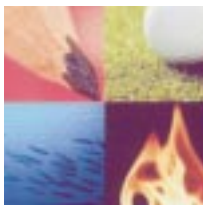


Epson Stylus Photo 750

HP DeskJet 880C

Lexmark Z51

BUDGET



Canon BJC-1000

Epson Stylus Color 440

SMALL BUSINESS

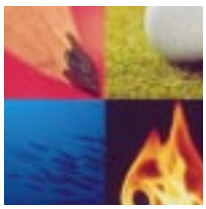
Canon BJC-6000

Epson Stylus Color 900

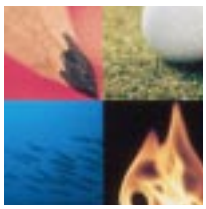
PHOTO

Canon BJC-7100

Epson Stylus Photo 750



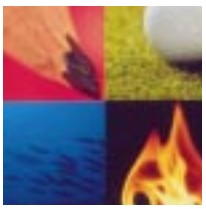
HP DeskJet610Ci



Lexmark Z11

HP Deskjet 895CXi

Xerox Docuprint C15



HP DeskJet 880C

Lexmark Z51

CorelDraw samples

BUDGET

Canon BJC-1000

Epson Stylus Color 440

HP DeskJet 610 C

Lexmark Z11

SMALL BUSINESS

Canon BJC -6000

Epson Stylus Color 900

HP DeskJet 895CXi

Xerox Docuprint C15

PHOTO

Canon BJC-7100

Epson Stylus Photo 750

HP DeskJet 880C

Lexmark Z51

Text samples

* plain paper * inkjet paper

BUDGET

Canon BJC-1000

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Epson Stylus Color 440

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

HP DeskJet 610C

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Lexmark Z11

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

SMALL BUSINESS

Canon BJC-6000

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Epson Stylus Color 900

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

HP DeskJet 895CXi

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Xerox Docuprint C15

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

PHOTO

Canon BJC-7100

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Epson Stylus Photo 750

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

HP DeskJet 880C

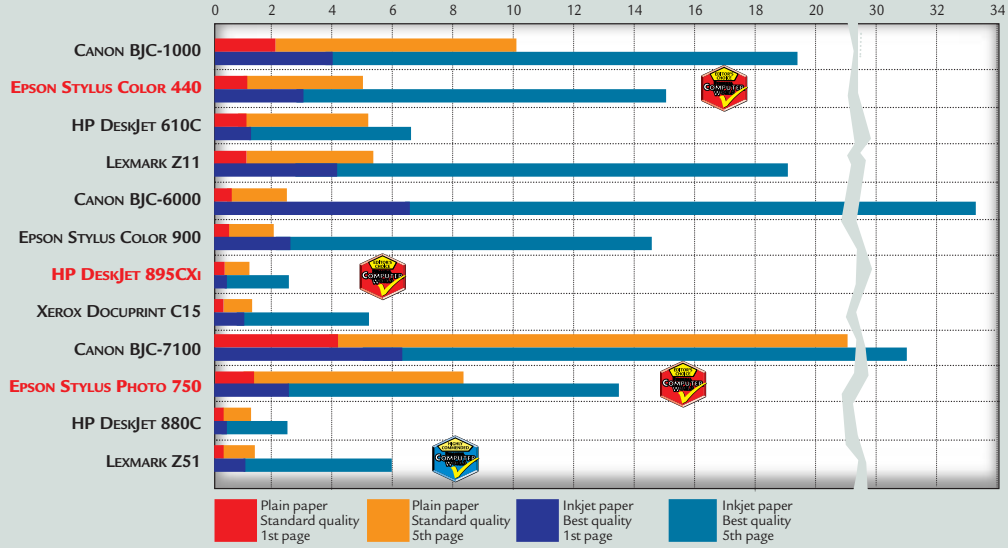
To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

Lexmark Z51

To do this part of the printer test, send this document to the printer five *
To do this part of the printer test, send this document to the printer five *

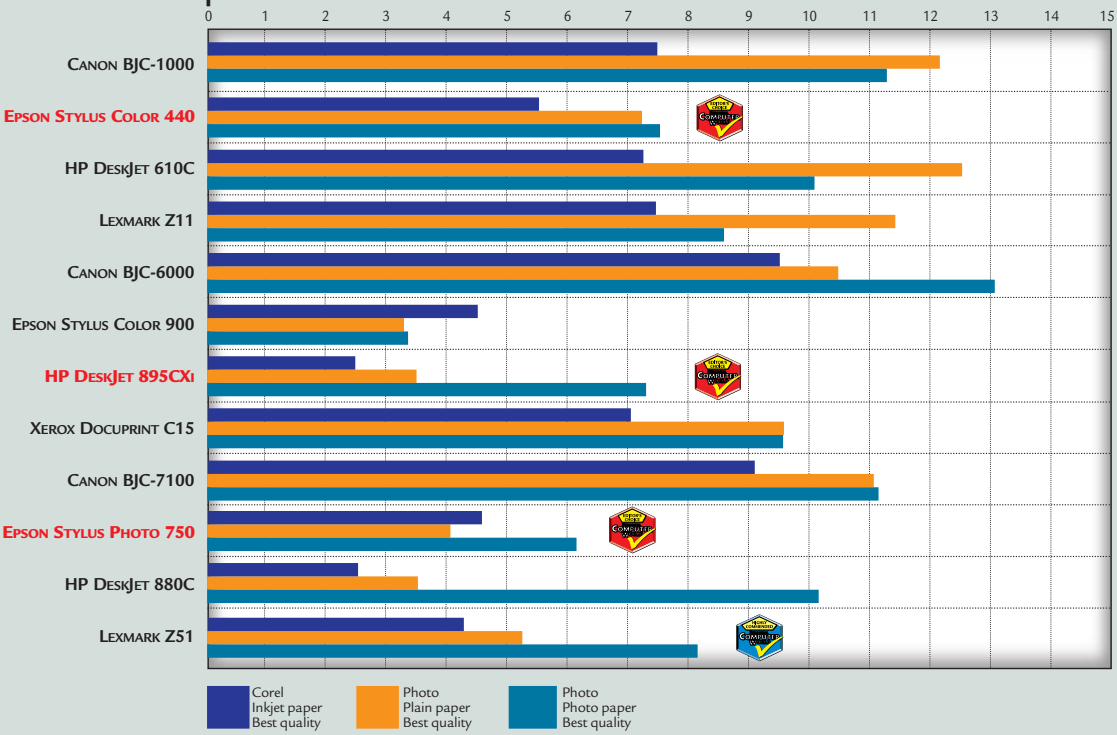
PCW Labs Report

Text test results



	Spool	1st Page	5th Page
Canon BJC-1000	00:04	02:07	10:17
	00:04	04:02	19:47
Epson Stylus Color 440	00:03	01:07	05:17
	00:03	03:07	15:12
HP DeskJet 610C	00:01	01:11	05:36
	00:03	01:28	06:50
Lexmark Z11	00:06	01:16	05:59
	00:05	04:16	19:10
Canon BJC-6000	00:04	00:41	02:48
	00:06	06:43	33:29
Epson Stylus Color 900	00:03	00:31	02:04
	00:02	02:57	14:49
HP DeskJet 895CXi	00:01	00:25	01:37
	00:02	00:37	02:38
Xerox DocuPrint C15	00:02	00:26	01:44
	00:01	01:08	05:36
Canon BJC-7100	00:04	04:18	21:14
	00:04	06:19	31:03
Epson Stylus Photo 750	00:06	01:48	08:31
	00:05	02:52	13:59
HP DeskJet 880C	00:03	00:24	01:36
	00:04	00:39	02:39
Lexmark Z51	00:02	00:22	01:45
	00:02	01:15	06:04

CorelDraw! and photo test results



	Spool	1st Page
Canon BJC-1000	00:04	07:41
	00:12	12:12
	00:08	11:26
Epson Stylus Color 440	00:04	05:48
	00:34	07:18
	00:38	07:46
HP DeskJet 610C	00:03	07:22
	00:17	12:52
	00:21	10:05
Lexmark Z11	00:06	07:36
	00:18	11:38
	00:19	08:59
Canon BJC-6000	00:02	09:46
	01:10	10:42
	00:27	13:04
Epson Stylus Color 900	00:06	04:52
	00:37	03:28
	00:55	03:39
HP DeskJet 895CXi	00:02	02:46
	00:02	03:50
	00:02	07:27
Xerox DocuPrint C15	00:02	07:02
	00:17	09:56
	00:15	09:49
Canon BJC-7100	00:04	09:04
	00:51	11:03
	00:53	11:11
Epson Stylus Photo 750	00:06	04:55
	00:39	04:03
	00:40	06:12
HP DeskJet 880C	00:02	02:49
	00:05	03:51
	00:07	10:11
Lexmark Z51	00:03	04:24
	00:17	05:20
	00:18	08:15

How we did the tests

We subjected the printers to five rigorous tests. We first printed five copies of a business letter at Draft, Standard and High quality on inkjet and photocopy paper. The spool time, the time for the first page to drop, and the time for the job to complete, were all recorded. Next, we printed business graphics at both Standard quality and Best on regular photocopy paper and the proprietary inkjet paper of the printer manufacturer. Again, spool and job completion times were recorded. Finally, we printed an A4 photo at Best quality on photocopy and photo paper. Spool and completion times were noted.

Table of features

Budget Printers



Manufacturer	Canon	Epson	Hewlett-Packard	Lexmark
Model	BJC-1000	Stylus Color 440	DeskJet 610C	Z11
Price ex VAT	£89.00	£84.26	£67.23	£100.00
Price inc VAT	£104.58	£99.01	£79.00	£117.50
Telephone	0121 666 6262	0800 220546	0990 47 47 47	01628 481500
Website	www.canon.co.uk	www.epson.co.uk	www.hp.com	www.lexmark.co.uk
Maximum resolution (dpi)	720 x 360	720 x 720	600 x 600	1200 x 1200
Cartridges held	1	2	2	1
Cost of mono cartridge ex VAT	£19.99	£13.48	£22.90	£19.53
Cost of colour cartridge ex VAT	£24.99	£14.54	£25.30	£23.57
Input paper tray	50 pages	100 pages	100 pages	100 pages

Office Printers



Manufacturer	Canon	Epson	Hewlett-Packard	Xerox
Model	BJC-6000	Stylus Color 900	DeskJet 895CXi	DocuPrint C15
Price ex VAT	£199.00	£299.00	£194.89	£219.00
Price inc VAT	£233.83	£351.33	£229	£257.33
Telephone	0121 666 6262	0800 220546	0990 47 47 47	0800 787 787
Website	www.canon.co.uk	www.epson.co.uk	www.hp.com	www.xerox.com
Maximum resolution (dpi)	1440 x 720	1440 x 720	600 x 600	1200 x 1200
Cartridges held	2	2	2	2
Cost of mono cartridge ex VAT	£8.99 ink only	£18.61	£22.90	£20.00
Cost of colour cartridge ex VAT	£6.99 each inkwell	£22.33	£25.30	£28.95
Input paper tray	130 pages	100 pages	100 pages	150 pages

Photo Printers



Manufacturer	Canon	Epson	Hewlett Packard	Lexmark
Model	BJC-7100	Stylus Photo 750	DeskJet 880C	Z51
Price ex VAT	£249.00	£203.40	£169.36	£180.00
Price inc VAT	£292.58	£239.00	£199	£211.50
Telephone	0121 666 6262	0800 220546	0990 47 47 47	01628 481500
Web site	www.canon.co.uk	www.epson.co.uk	www.hp.com	www.lexmark.co.uk
Maximum resolution (dpi)	1200 x 600	1440 x 720	600 x 600	1200 x 1200
Cartridges held	2	2	2	2
Cost of mono cartridge ex VAT	£29.99	£13.48	£22.90	£19.53
Cost of colour cartridge ex VAT	£31.99 cart & ink £19.99 just ink	£10.24	£25.30	£24.69
Input paper tray	130 pages	100 pages	100 pages	100 pages

Reaction to sunlight

Ink reacts to sunlight, fading after time. This is something the inkjet manufacturers are aware of, and try to make their proprietary inks, used in every one of their printers, resistant to fading. To test how light-fast the ink in each of our test printers was, we printed our standard test photo twice on each manufacturer's own photo paper. One copy was filed away in a drawer for a month, while the other was stuck to a west-facing window to see what effect the light would have on the once-vivid colours. As you can see from the results, the effect was far more striking on the output of some printers than on that of other models tested here. It's worth bearing these results in mind if you intend to use your printer for blowing up your holiday snaps, and especially if you're thinking of framing them and popping them up on a wall, unless you're happy for them to degrade over a fairly short period of time.

Samples exposed to sunlight


Canon BJC-7100


Epson Stylus Color 440


HP DeskJet 895CXi


Lexmark Z51


Xerox Docuprint C15

Samples kept in a file


Canon BJC-7100


Epson Stylus Color 440


HP DeskJet 895CXi


Lexmark Z51


Xerox Docuprint C15

Running costs

To get an idea of the real running costs of the printers, we installed a new cartridge in each printer and ran it dry by printing full text pages. Each page was numbered so that we could keep track of the point at which the ink supply was exhausted. The results of the test revealed that although some of the printers on test were very cheap, the true running costs might offset the initial purchase price. The graph below shows the number of pages printed and the cost per page.

Taking a typical office scenario printing 2,000 pages a year (around eight pages per day) and keeping the printer for three years, the best combination of initial price and running costs was the Epson 440, with the worst case being the Lexmark Z11. Increasing the load on the printer to 5000 pages a year and the Canon BJC-6000 sneaked ahead of the Epson 440, with the Lexmark Z11 still coming in last.

Endurance test

	No. of pages printed	Cartridge cost (inc VAT)	Cost per page
Canon BJC-1000	349	£29.36	8.41p
Epson Stylus Color 440	332	£15.84	4.77p
HP DeskJet 610C	344	£26.91	7.82p
Lexmark Z11	138	£27.69	20.07p
Canon BJC-6000	399	£10.56	2.65p
Epson Stylus Color 900	789	£21.87	2.77p
HP DeskJet 89CXi	553	£26.91	4.87p
Xerox Docuprint C15	683	£23.50	3.44p
Canon BJC-7100	523	£35.24	6.74p
Epson Stylus Photo 750	329	£15.84	4.81p
HP DeskJet 880C	590	£26.91	4.56p
Lexmark Z51	224	£22.95	10.24p

Editor's **Choice**

Hewlett-Packard has been claiming for some years now that dot pitch is an obsolete measurement of quality. The company touts alternative technology such as PhotoREt, whereby colours are layered to produce a wider variety of shades. It argues that this allows its printers to achieve what the eye perceives as continuous tone without breaking the 600dpi barrier.

HP also champions SmartFocus, which improves the look of low-resolution images such as those downloaded from the internet.

The three highest-resolution printers in this group test doubled HP's 600dpi, achieving a stunning 1200 x 1200dpi, but none of them received an Editor's Choice award, proving that to a degree Hewlett-Packard is right — resolution is not the ultimate measure of what makes a good printer.

That said, Lexmark's Z51 impressed us greatly. Aiming a printer at both the photo and office markets is a brave move, and the quality of its output was certainly good enough for all but the most demanding of users.

▼ **The Epson Stylus Color 440 is a budget printer that excels in ease of use and performance**

▶ **The Hewlett-Packard DeskJet 895CXi makes its mark in business printing**

Had we been end-users, we would have been more than happy with the Z51, and the only reason it was pipped to the post in our test is that the close scrutiny to which all printers are subjected in our labs takes into account even the most minute differences between one model and another. It beat every other contender in our fade tests, and after a month in a sunny window, its output most closely resembled the original article, so we didn't feel we could let it walk away empty handed. We therefore award it a special **Highly Commended** award.

We have decided this month to give three Editor's Choice awards, one for each of the three categories: budget, small business and photo. The first of our Editor's Choice awards goes to the **Epson Stylus Color 440**, appearing in the budget category. It's top resolution of 720 x 720dpi would have rivalled some of the best printers on the market just 12 months ago. It's very easy to use, which perhaps explains why it's such a popular bundle item for PC manufacturers. It was pretty zippy in our text-printing test, and we were impressed with its photocopy-paper performance, which will really cut down on running costs. It may not have had the highest resolution, but that in no way impeded its performance.

Hewlett-Packard takes home our second Editor's Choice award for the **DeskJet 895CXi**, which performed well in the business printers category. In true HP style, its installation routine was absolute simplicity, and the on-desktop printer toolbox gave instant access to the most commonly used maintenance functions without us having to get physical with the unit itself. Although not appearing in our photo printer category, the quality of the CXi's photographic reproduction was hard to fault, and at Draft quality its textual output was not only very quick to appear, but also good enough to use as final business documents.

Although the stacked input and output trays mean that the DeskJet 895CXi is about as far away as you can get from a straight paper path, it does keep things neat, like every other DeskJet in this range, this model has excellent paper-handling capabilities.

Our third and final Editor's Choice award goes to a contender in the photo printer market, the **Epson Stylus Photo 750**. Although it demonstrated some feathering on both photocopy and inkjet paper when printing black text, by far the most important consideration in this category was how it handled our A4 photo: in this respect, the Photo 750 excelled. Skin tones were a very close match for the original image, and neither banding nor graininess could be found anywhere on the page. On areas where dark colours shared a common border with lighter ones there was no bleeding, so all edges remained crisp and clean. At just over £200 ex VAT it was also excellent value for money. ❐

Illustration by Paul Shorrock

The really Useful Group

PC utilities have something for everyone, from problem-solving packages to handy little helpers every computer should have.

Utility software is designed to do one of three types of job. It can prevent problems before they happen and correct problems after they have happened; it can add features to existing software (such as enhancements to tools that come with Windows); or it can do something which makes computing life easier (such as take the stress out of Internet searching or read unusual file formats).

Utility software has become a huge market, offering everything from useful little tools that take up just a few kilobytes of disk space, through to huge disk-gobbling packages which attempt to do everything except make the tea. The majority soon find a home on somebody's computer, but there are a few that should find a home on everybody's computer.

Here we look at 20 of the best utilities around. Included among them are programs that make hard-disk partitioning fun instead of a nightmare, that allow you to run multiple operating systems at the same time, that can find valuable free hard-disk space, compress bulky files, protect data from prying eyes, bring files back from the dead following a hard-disk crash, and much, much more.

Ratings

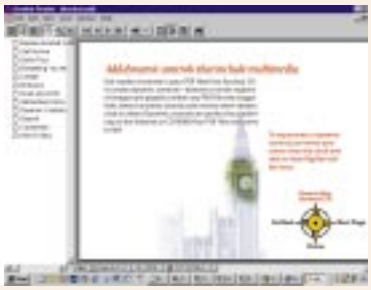
★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Contents

• *Utilities reviewed by Paul Begg, Roger Gann and Nik Rawlinson*

Acrobat Reader

There's no reason why you shouldn't have Acrobat Reader among your utilities. It's useful, easy-to-use and can be downloaded free on the Internet! Acrobat is a software package used by people to create documents in a format known as PDF (Portable Document Format), which gives them the advantage of appearing exactly as they were created, regardless of the medium or the platform. So PDF files printed from a Mac look exactly the same as when downloaded to a PC from the net and viewed on-screen. Acrobat, currently in version 4, can be bought as a separate package for £149 ex VAT if



you need to create PDF files.
Originally, Acrobat Reader was a free utility Acrobat users could distribute along with their PDF documents. Over the years, however, more and more people have started using Acrobat to create documents for publication on the Internet. If you download these, you need the Reader to view them, so the Reader has become an essential utility.
You can view files as a page, a page with an index (as illustrated) or a page with thumbnails. You can zoom in or out of the page and it will always be seen exactly as its creator intended.

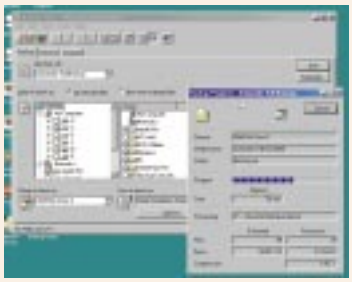
PCW DETAILS

★★★★

Price *Free*
Contact *Adobe 0181 606 4001*
www.adobe.com

Backup Exec Desktop 98

Today's PCs come with multi-gigabyte hard disks, and with so much data in use, the need for good back-ups has never been greater. Windows 98 comes with a 'lite' version of Backup Exec, but for serious backup jobs you'll want the



bells and whistles version, Backup Exec Desktop 98. The Backup Exec supports a range of backup media, including SCSI and IDE removable media devices, parallel-port tape devices, floppy disks, hard drives, network drives, CD-R, CD-RW and DVD-RAM, and can automatically detect all of these.
The user-friendly interface resembles Explorer: it also features a number of wizards to simplify the backup process. A drive tree allows the easy selection of individual files, folders or complete drives. You can also choose the type of backup to perform: full, incremental or differential. The catalogue/find feature makes it easy to locate an individual file for an immediate restore. Full back-ups or restores are just a matter of pointing to and clicking on major choices – the source and destination drives.
It can also create an Emergency Disk, letting you boot and restore back-ups without reinstalling Windows 98 first, and can perform scheduled back-ups.

PCW DETAILS

★★★★★

Price *£52.88 (£45 ex VAT)*
Contact *Veritas Software 0870 243 1080 www.veritas.com*

ClipMate 5

ClipMate is an enhancement for Windows Clipboard, and once installed, you'll wonder how you ever managed without it – we know that's a hackneyed phrase, but it's true. Clipboard is frustrating in that unless you're running Office 2000, you can only copy one item to it at a time, which is annoying if you're copying a series of extracts from a document and you can't save to the clipboard and hold stuff there until you're ready to use it. That's where ClipMate steps in and makes itself indispensable.
As you may have guessed, you can copy multiple items to ClipMate – and that includes graphics and text. ClipMate

also doubles as a screen capture utility, being able to save and export captured images as bitmaps or JPEGs.
You can also store images in collections, which turns ClipMate into a mini-database for clippings. And you can edit the clippings from within ClipMate too because this little utility boasts an array of editing features you'd only find in a standalone text editor. The latest version also includes the new ClipMate Explorer, which looks like the Windows Explorer, and lets you view in List mode or Thumbnail mode, and you can select, preview, edit and manage clips, as well as retrieve, append, print, reformat, and edit data.

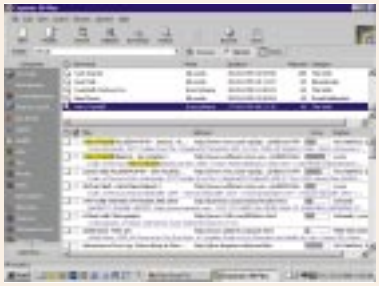
PCW DETAILS

★★★★★

Price *$20 (£12.50) if ordered online, $25 (£15.62) by post and if you require a disk*
Contact *Thornsoft 001 716 352 4223 www.thornsoft.com*

Copernic

Finding what you want on the Internet has become increasingly frustrating over the years, and a number of utilities have been introduced to speed up the process. One of the best is Copernic, and the amazing thing about it is that a version can be downloaded from the net that costs you absolutely nothing. Copernic simultaneously consults up to 32 of the major search engines for responses to your search criteria. By consulting more than one search engine, Copernic manages to find even the most obscure responses. Then Copernic lists them in order of priority and keeps the list so you can consult it



later – no more searching for that fabulous website you forgot to bookmark! On top of which, you can update the list whenever you feel like it. You can search the web, newsgroups and email. The basic version of Copernic does this all for free, but a nominal fee can get you a souped-up version. This lets you narrow your searches to 21 categories, such as Books, Kids, Health, Music and Movies, but increases the number of search engines consulted to 125 or more.

PCW DETAILS

★★★★★

Price *Free to download or increased functionality registered version for $29.95 (£18.72)*
Contact *Copernic Technologies (Canada)* *www.copernic.com*

DisplayMate For Windows

It's curious, but while we all spend ages making sure our computer runs smoothly, configure Windows to operate just the way we like it, and tune our programs to achieve optimum efficiency, the thing we neglect is the display, which we stare at for hours at a time. Is your video display running at its best? With DisplayMate for Windows, you can find out.

DisplayMate is a utility for setting up, tuning, testing and evaluating any computer monitor or video display for optimum image and picture quality. It's easy to use, and no experience of video whatsoever is needed. It works by presenting over 110 specially designed and highly sensitive test patterns which address every image problem you could think of. Each test pattern is accompanied by a detailed Information Screen explaining what you should look for, and there are detailed step-by-step instructions of what to do if the image can be improved.

DisplayMate may address every display problem this side of Alpha Centauri, but it only addresses one type of computer problem, and the price seems exorbitant when compared to a product like Norton System Works, which addresses a broad range of problems. That said, if the optimum display is important to you, DisplayMate is the answer you'll have been looking for.

PCW DETAILS

★★★★

Price *£81.08 (£69 ex VAT)*
Contact *Meko 01276 22677*
www.displaymate.com

Drive Image 3.0

Drive Image 3.0 takes an image of your hard disk or partitions and stores it on another local drive, partition, network, or removeable drive. It takes a complete snapshot of your operating system, applications and configurations. This allows you to restore your whole system to the way it was or, alternatively, to upgrade your hard disk if you can't face reinstalling everything. But its main function is workstation cloning, when you're rolling out a network: it can 'multi-cast' one image copy across the network to multiple workstations. It can copy FAT, FAT32, NTFS, Linux, Unix, NetWare and HPFS partitions. Drive Image is basically a DOS utility fronted by a GUI and will support 8Gb hard drives, and image files up to 2Gb. You can run the process from the menus or use the step-by-step Wizards. Options include the ability to compress image files, and the ability to span multiple drives or disk cartridges.

The Drive Image File Editor lets you select specific files from your drive image if you don't want to restore the whole thing. You can also cut and paste between partitions. The Pro version comes bundled with a copy of that useful hard-disk utility, Partition Magic. This is essential, as Drive Image doesn't allow you to resize partitions.

Although invaluable for network administrators, the needs of single users are better met by DriveCopy.

PCW DETAILS

★★★

Price *10-user licence £146.53 (£124.70 ex VAT)*
Contact *POW! Distribution 01202 716726*
www.powerquest.com.

FreeSpace

Who doesn't need more disk space? A hard disk is rather like a loft or a cellar: no matter how big it is, it seems to get filled. It might be filled with junk, but it's the sort of junk you might need one day and which takes a hardened spirit to deposit in a black plastic bag. Buying a new and bigger hard disk simply isn't always feasible, so a budget, hardball compression utility like FreeSpace can be a boon.

Unlike a basic file-compression utility such as a ZIP utility, which is essentially designed to create a ZIP archive, FreeSpace first shrinks the files to their smallest possible size, then uses the

TightCluster feature to squeeze them even tighter still. The space you gain is little less than remarkable – 150Mb of TIF graphics files can be compressed to a mere 31Mb. That's 119Mb of hard-disk space released for other uses. You can even tell FreeSpace how much space you need and it will search your hard disk for the space. The best thing about FreeSpace is that the compressed files open and close and otherwise behave as if they were uncompressed files.

FreeSpace comes on a single floppy disk and is a snip to install and use, with Wizards holding your hand step-by-step through the compressing process.

PCW DETAILS

★★★★

Price *£29.99 (£25.52 ex VAT)*
Contact *Mijenix 01297 552222*
www.mijenix.com

Lost and Found

Lost and Found is a bit expensive, especially when you remember that it's a piece of software you'll hopefully never have to use. On the other hand, it's a bit like health insurance in that if there's an emergency you'll be glad you've got it. And health insurance isn't a bad analogy, because Lost and Found restores your all-important data following a disk-head crash, corruption by a rogue application or virus infection, and any other data-loss nightmare on computer street.

If *War and Peace* is a book you've never read but wanted to, Lost and Found will give you the chance. This software is very thorough. It begins by scanning your hard disk – which is when you'll want *War and Peace* to hand – finds the files, and colour-codes them according to their chances of recovery. You choose what you want to bring back from the dead, and hey presto! You'll need to have another drive and a large pile of floppies to back up to, however.

Lost and Found comes on a single floppy and is booted from DOS. It is a heart-stopping disaster recovery utility and may you never have to use it.

PCW DETAILS

★★★★

Price *£49.35 (£42 ex VAT)*
Contact *Software Warehouse 08000 355 355*
www.displaymate.com

Net.Medic

We all want faster Internet connectivity, but it's often hard to identify where the bottlenecks lie. Net.Medic is a browser companion that monitors, diagnoses and corrects Internet or intranet performance problems and lets you identify the source of any network bottleneck. Net.Medic is happy with both Navigator and Internet Explorer browsers. A 30-day trial version is available from www.ins.com

Net.Medic's data is displayed in a control panel consisting of several animated meters. The default display consists of a scrolling ticker and three real-time display panes. The ticker

displays performance stats related to the site you're currently connected to, including site name, URL, page size, number of visits, and estimated network and site delays. The modem-status panel shows transfer rate and data compression, while the ISP pane has a graph that indicates any delays over time and estimated congestion.

If a component's performance drops, its graphic turns yellow; more serious problems turn it red. Double-click on a problem item and a health log pops up. Then ask Net.Medic for a diagnosis. If the problem lies with you, an auto-cure option is available; if with the ISP or website, you can fire off a technical log email to notify the powers-that-be.

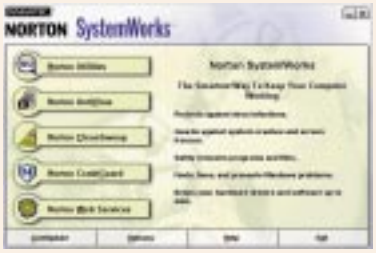
PCW DETAILS

★★★★

Price *£41.13 (£35 ex VAT)*
Contact *INS 01628 503000*
www.ins.com

Norton System Works

If you want an all-round utilities package, you have a number of excellent choices. First up, McAfee Office is a collection of nine programs. Previously sold separately, there is no integration, inevitable duplication, and 154Mb of gobbled-up hard-disk space. Secondly, the excellent Fix-It Utilities finds and clears viruses, runs the usual hard-disk diagnostics, has crash protection, an uninstaller, a registry checker and Year 2000 diagnostics. It includes the indispensable PowerDesk Utilities 98, occupies 40Mb hard-disk space, and costs £39 – the best buy for home users. But old favourite Norton System Works



remains the crème de la crème of the utility world. It's almost double the price of Fix-It, but combines Norton's Utilities 4.0, Antivirus 5.0, Cleansweep 4.5, Crashguard 4.0, and a six-month subscription to Norton Web Services. And it all fits in 122Mb.
Norton Utilities groups 20 tools under four categories: Find and Fix Problems (Norton WinDoctor, Norton CrashGuard, Norton Disk Doctor); Improve Performance (Speed Disk, Optimisation Wizard); Preventative Maintenance (Norton System Doctor, Rescue Disk, Registry Tracker); and Troubleshoot (Norton Registry Editor, Norton Web Services).

PCW DETAILS

★★★★

Price *£86.95 (£74 ex VAT)*
Contact *Symantec 01628 592 222 www.symantec.co.uk*

Partition Magic

Partition Magic, which takes the effort out of partitioning a large hard disk, is an established product which has reached version 4.0. Formerly a DOS program, it has finally entered the Windows world. With large hard disks,

partitioning is essential, having the additional advantage of being able to reclaim hard-disk space lost to inefficient FAT (File Allocation Table) partitions if you're running Windows 95 or 3.X. Frankly, doing anything which affects areas such as the FAT and other esoteric areas of the computer is scary. But Partition Magic does its best to ease the exercise. Bright, jolly and comfortable, with large, friendly icons and an overall feeling of fun, its Wizards guide you step-by-step through the partitioning process. You can preview the effects of partitioning before making changes, and create, move and resize partitions.
Partition Magic includes support for FAT, FAT32, NTFS, HPFS and Linux ext2, and it lets you switch between FAT and FAT32, and move programs between partitions. This mix of power and features makes it a winner. And you get BootMagic too, which lets you use multi-operating systems.

PCW DETAILS

★★★★★

Price *£49.98 (£42.54 ex VAT)*
Contact *Pow! 01202 716 726*
www.powerquest.com

Post-it Software Notes

It seems that no office is free of those yellow Post-it notes. They get stuck everywhere! And you can stick them on your computer in all senses of the word – stick the paper version on your monitor or the software version on your hard disk.
The electronic Post-it note works in the same way as the paper version – just click, type your note, and stick it on your desktop – but has additional benefits which can make it almost indispensable. To begin with, you can set alarms to go off and remind you of appointments, meetings, or just things you have to do. You can organise and store your notes on customised

Memoboards, which makes this useful for keeping information such as price lists or internal phone numbers to hand for quick consultation. You can also automatically insert the date/time on notes, which is useful for leaving messages, and if you and a colleague are both using Post-it Notes and are connected via a LAN, you can pop up a note, photo, or figures on your co-worker's computer.
Post-it Software Notes sounds fun and frivolous, but it actually has so many serious uses that you'll find yourself turning to it far more frequently than you'd ever imagined.

PCW DETAILS

★★★★

Price *£23.50 (£20 ex VAT)*
Contact *Inmac 0990 440033*
www.mmm.com/psnotes

PowerDesk

PowerDesk is a replacement for Windows Explorer and it really is the utility that we'd most hate to be without. The heart is a File Manager which, like Explorer, has two viewer panes. The one on the left shows the directories and the one on the right lists the files – and it does all the things Windows Explorer will do such as copy, move and delete. But where it differs from Windows Explorer is that it has an integrated viewer pane, which uses the built-in QuickView utility that comes with Windows. With support for 80 different file types, this means that you can quickly and easily view text and

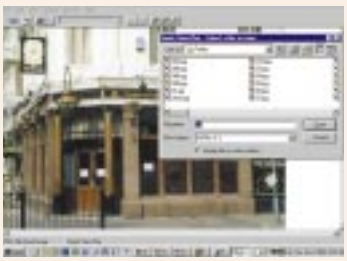
graphics files without having to launch the attendant application.
There are lots of additional tools such as a powerful file finder, a file synchroniser, size manager and a registry editor. With these tools you can find 'lost' files, ensure that your files are the same on your desktop and laptop machines, and find out which files are occupying the most hard-disk space. There's also a useful built-in archive manager which supports .ZIP, .ARJ and .LHA formats, and a graphics converter with which you can convert graphics between 24 formats.

PCW DETAILS

★★★★★

Price *£19.96 (£16.99 ex VAT)*
Contact *Mijenix 01297 552222*
www.mijenix.com

Quick View Plus



A reduced version of the Quick View file viewer comes free with Windows. You can access it from the Windows Explorer and it lets you view files without launching the associated application. In fact, you can view files without even having the associated application, which makes it useful indeed if you receive files created using programs you don't possess. Quick View Plus is a worthwhile enhancement to Quick View and extends its capability to view files to about 200 file types, including Windows, DOS, Mac and Internet file types.
The Quick View Plus File Viewer not only lets you view files in their native formats (or as text or hexadecimal), it adds basic file management, the ability to print a file, rotate, zoom and show images full-screen, and even convert an image to Windows wallpaper. Quick View also integrates seamlessly with PowerDesk and with Adobe's Acrobat Reader.
However, most people won't need Quick View Plus. Quick View itself does pretty much all that the average user will need, and copes with the most common formats.

PCW DETAILS

★★★★

Price *£34.99 (£28.78 ex VAT)*
Contact *Inso 01344 867 222*
www.inso.co

RealPlayer G2

If you want to enjoy video and audio streaming over the Internet, you'll need RealPlayer G2. Like NetMeeting, RealPlayer G2 copes with a variety of Internet streaming media types, but you'll need both as neither supports all streaming formats. RealPlayer G2 is a free download: RealPlayer Plus G2, which costs $29.99, adds an equaliser and customisation features such as video controls.
G2 has a number of improvements over version 5.0, principally in the area of content management and playback control. It also offers improved performance through a new music codec technology, new video-smoothing capabilities, and the introduction of RealText (for live streaming text) and RealPix (for streaming still images) media types. It updates itself automatically, using push technology.
Sound quality remains impressive but still a long way short of hi-fi: it's roughly on a par with AM radio but in stereo, and that's with an ISDN line.
The amazing ability to display low-res videos in sync takes some of the edge off our carping, though.
Ultimately, given its less than compelling (though laudable) audio performance over a dial-up connection, RealPlayer G2 is for those with the luxury of a fast, permanent Internet connection. When we all have ADSL or cable modems RealPlayer will be a 'must-have' utility.

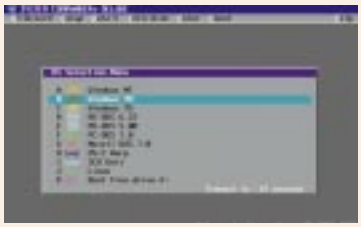
PCW DETAILS

★★★★

Price *Free, or $29.95 (£18.72) for the Plus version*
Contact *RealNetworks 01932 581000 www.uk.real.com*

System Commander Deluxe

Most people have only one operating system installed on their PC, but there are some folk who need more. You can use good old FDISK to switch active partitions and thus choose which OS to boot with, but if you want lots of operating systems installed, you'll need something like System Commander Deluxe. The latest version, 4.0, includes an OS Wizard, which simplifies the potentially fraught installation process. This finds and prepares space on your hard drive for an additional operating system. It also lets you create, format, resize and delete disk partitions, including additional goodies such as



temporary partition hiding and FAT32 conversions for use under Windows 9x. Version 4.0 supports pretty much any OS, including Windows 95/98, NT, OS/2 Warp, CTOS, NetWare, NextStep, Pick, QNX and various Unix platforms. You can install up to 100 operating systems on a single machine. We cheerfully installed five versions of DOS, some in their own private partitions. There are a couple of gotchas: you can't use it on compressed drives, and operating systems that write to the Master Boot Record (eg Windows 98 and OS/2 Warp 4.0) have to be treated specially. It's not particularly easy to use, but once set up, it works very well.

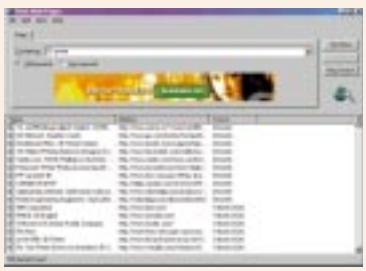
PCW DETAILS

★★★★

Price *£49.99 (£42.55 ex VAT)*
Contact *MediaGold 0171 372 9762 www.v-com.com*

WebFerret

WebFerret, like Copernic, is an Internet search tool. You enter the keywords you want to search for, then WebFerret goes to work, sending the search information to no fewer than 27 search engines. It then retrieves the results, and deletes, duplicates or rates them according to which it thinks best fit your criteria. Selecting a search result causes a brief description of the page to



open in a window, and a double-click will open the page in your browser. The Freeware version is powerful and demonstrates the power of the Pro edition, but the Pro package does have an array of additional features. For example, only the Pro version lets you view Abstracts. WebFerret Pro employs many more search engines, as one might expect, and only this version eliminates duplicates. It also has Boolean searches, search files that can be saved, and results are ranked by relevance. WebFerret Pro can be downloaded for $26. 95.
Whether or not you prefer Copernic or WebFerret is really a matter of taste, so it's useful that you can download a trial version of both from the Internet – and the download cost of both will soon be repaid with faster, more efficient and more productive searching.

PCW DETAILS

★★★★

Price *Free*
Contact *FerretSoft www.ferretsoft.com*

WinZip

If you send files over the Internet, especially graphics files, then it's essential that you compress them. This will dramatically reduce the time it takes to send and receive the file. The industry-standard file compression utility is WinZip.
WinZip tightly integrates with Windows Explorer, allowing you to zip and unzip files without leaving Explorer. WinZip will automatically install almost any software downloaded from the Internet, providing the Zip files contain a Setup or Install executable. WinZip also automatically cleans up all the temporary files involved in such an installation.

Newcomers will like the WinZip Wizard which holds your hand through unzipping and installing Zipped software. Old hands can turn off the Wizard to access the more advanced zipping features available by using the WinZip Classic interface.
Very useful is the Favorite Zip Folders feature which lets you organise Zip files in one convenient list regardless of where they are stored on your hard drive. A Search facility will find any Zip files lost on your hard disk. Another excellent feature is WinZip Self-Extractor Personal Edition, now included with WinZip, which lets you create self-extracting Zip files.
WinZip has the benefit of being shareware.

PCW DETAILS

★★★★

Price *£23.49 (£19.99 ex VAT)*
Contact *Software Warehouse 0800 035 5355 www.winzip.com*

WS_FTP Pro

Many web authoring packages have FTP capabilities built in, but a lot of users still have need for a standalone FTP utility. This is often because they use the authoring tool for downloading from the Internet, and find that the built-in FTP functions of Netscape Navigator and Internet Explorer are too basic for their needs.

Split into two independently navigable windows, WS_FTP Pro simultaneously displays both the local and remote directories. Transferring a file or selection of files from one location to the other is simply a matter of highlighting as appropriate and then clicking either the forward (transmit) or back (retrieve) button.

Setting the file-type radio button selection to Auto means that WS_FTP will detect whether to use ASCII or binary transfer mode itself. WS_FTP Pro can also be set to log all transactions and then drop a file of all the relevant details in each destination directory. Another powerful feature of WS_FTP Pro is that it can keep track of the sites you visit, and the user names and passwords you use to access them. Your saved destinations are stored on a drop-down menu so that all you need to do is click 'Connect'.

PCW DETAILS

★★★★

Price *Download for $37.50 (£24.10)*

Contact *Ipswitch 001 781 676 5700 (US)* *www.ipswitch.co.uk*

ZipMagic

WinZip has been around so long that it's hard to imagine computing without it, but recently it has been challenged by ZipMagic – a file-compression utility so easy to use that it has won an army of staunch supporters. The beauty of ZipMagic is that you don't have to unzip files to use them, as with conventional file compression.

ZipMagic treats Zip archives as ordinary folders. It automatically compresses and uncompresses files as and when you need them, without you having to launch a separate application to unzip them before you can view the contents. You can browse Zip archives with all the speed and ease as you would an ordinary file. You can use it to make and view self-extracting archives, and convert Zip archives into them. The program includes tools to compress, extract, repair, convert, test, and edit the contents of Zip archives, while a browser plug-in enables you to view Zip files on-line.

ZipMagic has an excellent Explorer-like interface which makes zipping, unzipping and browsing Zip files easy. It also integrates seamlessly with Explorer and meshes with PowerDesk. It supports more file compression formats than any other product.

PCW DETAILS

★★★★★

Price *£ 34.99 (£29.78 ex VAT)*

Contact *Mijenix 01297 552222* *www.mijenix.com*

Other useful utilities

While the 20 utilities featured in this group test are useful for any desktop, there are other smaller utilities that will make your computing life more pleasant. With the explosion of MP3, no PC should be without an MP3 player. The *PCW* office favourite is Sonique <www.sonique.com>, but try MusicMatch 4.05 <www.musicmatch.com> or Real Jukebox from Real Networks <www.real.com>. But to play MP3s you first have to get hold of them. MusicMatch can be used for encoding MP3s from CDs, while there are numerous MP3 sites from which to download tracks (see the MP3 feature on p122 for more details).

We have reviewed RealPlayer, but to be able to play all kinds of streaming data, you should also get hold of Apple QuickTime 4 <www.apple.com/quicktime> and Microsoft's Netmeeting <www.microsoft.com>.

Speaking of Internet tools, no browser is complete without a raft of plug-ins. First of these is Shockwave from Macromedia <www.shockwave.com>. The latest version comes with a remote control device to control the shockwave animations. There is even a ShockMachine you can buy to watch shockwave movies and animations, and even to play shockwave games (all downloadable from www.shockwave.com). And you shouldn't forget Macromedia Flash <www.macromedia.com/software/flash>.

Finally, there are the diagnostic and system tools included with Windows 98. These include much more than ScanDisk and defrag tools, now having useful utilities such as a Maintenance Wizard and System Information.

best buys

Desktop PCs

Due to the fast-moving nature of the PC industry, we can only recommend particular PCs in the month we have seen them. Prices change almost weekly, as component prices from third-party suppliers fluctuate according to availability. So, for the best current PC buy, for instance, look at last month's group test on page 134.

It always pays to take a little care when buying a PC or in fact any hardware or software. For *PCW*'s guide to buying direct, see page 285. And don't forget to use the *PCW* Order Form [page 286].

Everyone's ideal PC will have a different mix of components, with gamers needing a very good 3D graphics card, probably a 3D sound card and excellent speakers, while business users will need a good monitor and plenty of RAM.

Entry-level PCs

Budget-conscious buyers might consider choosing a non-Intel processor like an AMD. But be aware that if you choose a Socket 7 chip, you'll only be able to upgrade to an AMD processor in future. Most Celerons are only being sold in Socket 370 format rather than in Slot 1 format, so if you get a Socket 370 processor you won't be able to upgrade it to a PIII at a later date. Check what processor format you will get when you order. If you are only offered a Socket 370 processor, insist on a Slot 1 board and 'Slocket' combination with 100MHz RAM to maximise the upgrade potential. Look at last month's group test for £699 (inc VAT) PCs.

We would recommend the following specification:

- **AMD K6-2 400 or Intel Celeron 400 processor**
- **32Mb RAM**
- **4Gb hard drive**
- **Graphics card with 8Mb video RAM**
- **15in monitor**
- **CD-ROM drive**

Expect to pay around **£599 (ex VAT)** for this configuration, but you may have to pay extra for a sound card and speakers or a modem.

Mid-range PCs

In the mid-range, around **£1,000 (ex VAT)** will get you a good all-round PC. The introduction of higher-speed PIIIs has meant the slower PIIIs have dropped in price, bringing them into this mid-range category. However, the stunning result of the K6-III, and its low price, make it worth serious consideration.

Look for a minimum of:

- **Intel PIII or AMD K6-III 500MHz processor**
- **64Mb RAM**
- **8Gb hard disk**
- **Good 3D graphics card with 16Mb video RAM**
- **17in monitor**
- **CD-ROM drive**
- **Sound card, speakers, 56K modem**

For an in-depth look at the K6-III, see the PC group test in our July '99 issue.

High-end PCs

If you're after a state-of-the-art machine, be prepared to spend around **£1,500 to £2,000 (ex VAT)**. What you require at this price will be specific to your needs, depending on how you intend to use the machine. However, as a basic specification we would want:

- **PIII 600 or Athlon 600MHz**
- **128Mb 100MHz RAM**
- **16Gb hard drive**
- **Good 3D graphics card with 32Mb video RAM**
- **19in monitor**
- **DVD drive**
- **Sound card, speakers, 56K modem**
- **Bundled office suite**

For a close look at Athlon, see this month's group test.

High-end notebook

Sony
Vaio PCG F190

Designed to replace your desktop PC, Sony's Vaio F190 features a deliberately large keyboard and 14.1in TFT display. As standard it boasts built-in DVD-ROM and floppy drive, DV editing facilities and the muscle of a mobile 366MHz Intel Pentium II. Measuring 324 x 40 x 265mm and weighing 3.1kg, it excels as a power portable.

PCW May '99, p84

Price *£2,501.57* **Contact** *Sony 0990 424424*
Also Recommended *Dell Inspiron 7000 A366LT (PCW April '99)* **Price** *£1,820.08* **Contact** *0870 152 4850* ◆ *Compaq Armada 7800, (PCW March '99)* **Price** *£3,461.55* **Contact** *Contact 0181 332 3000*

Mid-range notebook

Dell
Inspiron 3500

The Dell Inspiron 3500, with its Mobile Celeron 366, 64Mb of RAM and 4.8Gb hard disk is not only well specified, but also has an outstanding build quality. The screen has an even luminescence and vivid colours and it also comes with a very good software bundle.

PCW September '99, p181

Price *£1,643.83* **Contact** *Dell 0870 152 4850 www.dell.co.uk*
Also Recommended *Esprit Tycoon* **Price** *£1,468.75* **Contact** *Esprit 01670 737888 (PCW September '99)* ◆ *Sharp PC-A150* **Price** *£2,109.13* **Contact** *Sharp 0800 262958 (PCW March '99)*

PDA

Psion
Series 5mx

Retaining the Series 5's good looks, Psion has doubled the memory size and processor speed to 16Mb and 37MHz respectively, and built email software into the ROM as well as improving the screen and backlight. It's not greedy, either, lasting the average user a month on a single pair of AA batteries.

PCW August '99, p92

Price *£429.95* **Contact** *Psion 0990143050 www.psion.com* **Also Recommended** *Hewlett Packard Jornada 820e* **Price** *£945.88* **Contact** *HP 0990 474747* ◆ *3Com Palm V* **Price** *£349.99* **Contact** *3Com 0800 7311064 (both PCW July '99)*

Colour inkjet

Hewlett-Packard
DeskJet 895CXi

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced. Even its 'econofast' mode could be used for vital documents, saving both time and ink. It takes a huge range of papers and replacing ink cartridges is a breeze.

PCW October '99, p177

Price *£292.58* **Contact** *HP 0990 474747* **Also Recommended** *Epson Stylus Colour 740* **Price** *£179* **Contact** *0800 220546* ◆ *Epson Stylus Colour 850* **Price** *£199* **Contact** *0800 220546 (both PCW February '99)*

Colour photo printer

Epson
Stylus Photo 750

Easy installation, a five-colour cartridge for photo printing and an extensive driver make this printer an attractive proposition. Its photo reproduction could not be faulted and its job turnaround is impressively fast, too. Black text on photocopy paper was a little disappointing, but the price should suit most pockets.

PCW October '99, p180

Price £239 Contact Epson 0800 220 546 www.epson.co.uk
Also recommended: Lexmark Z51 Price £211.50 Contact Lexmark 01628 481500

Budget laser printer

Kyocera
FS-680

In a chassis designed by Porsche, the FS-680 is a speedy little printer, churning out 9ppm. It is aimed at small workgroups and you can buy an optional Ethernet adaptor to include it on the network. It also comes equipped with a 50MHz PowerPC processor and 4Mb of RAM, upgradable to 36Mb.

PCW September '99 p96

Price £351.33 Contact Kyocera 0345 103104 www.kyocera.de
Also recommended *Samsung ML-5100A Price £292.58 Contact Samsung 0800 521652 (PCW July '99 p98)*

Business laser printer

Hewlett-Packard
LaserJet 4050TN

Hewlett-Packard dominates the laser printer market and it's easy to understand why when you see the output from this printer. Its 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16Mb of RAM it can turn out an impressive 16ppm. On top of all that it comes network ready.

PCW September '99 p96

Price £1,580.38 Contact HP 0990 474747 www.europe.hp.com
Also recommended Lexmark Optra K1220 Price £658 Contact Lexmark 01628 481500 (PCW February '99 p201)

Multifunction device

Hewlett-Packard
LaserJet 3100

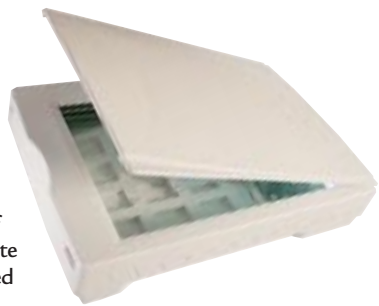
This quiet machine produced good quality laser prints. It's intelligent enough to detect a document dropped into its feeder and then launches an idiot-proof menu for copying, scanning and emailing. Fast, accurate OCR, and 2Mb memory for incoming faxes when the paper runs out, make the 3100 an ideal multifunction device.

PCW June '98, p83

Price *£722.63* **Contact** *HP 0990 474747*
Also Recommended *Canon MultiPASS MPC20* **Price** *£527.58*
Contact *Canon 0181 773 6000 (PCW January '98)*

Flatbed scanner

Umax
Astra 610P



Once again, the Umax Astra 610P parallel-port scanner has won our budget flatbed-scanner group test, boasting an unbeatable combination of performance and value. Note that our three recommended scanners require enhanced parallel ports found only on modern PCs, so users wanting top performance, or those with older systems, should stick to SCSI.

PCW September '98, p229

Price *£69.33 Contact Umax 01344 871329* **Also Recommended** *Agfa SnapScan 310P* **Price** *£116.50* **Contact** *Agfa 0181 231 4200* ◆ *Microtek Phantom 330CX* **Price** *£75.95* **Contact** *Microtek 01908 317797 (both PCW September '98)*

best buys

Digital camera

Canon Powershot Pro70

This good-looking camera takes amazingly natural-looking pictures and has enough features to keep any user happy. Its dual Compact Flash slots make for extended periods without having to download, while its 1,536 x 1,024 pixel resolution will give you superb prints.

PCW May '99, p199

Price £1,173.83 **Contact** Canon 0121 666 6262 **Also Recommended** Ricoh RDC-4200 **Price** £500 **Contact** Johnson's Photopia 01782 753355 ◆ Olympus C-900 Zoom **Price** £650 **Contact** Olympus 0171 253 0513 (both PCW May '99)

Monitor

CTX PR710T

Not only does the 17in PR710T look gorgeous, its performance is stunning. It sports a genuine Sony Trinitron tube, which is always a good sign. Power regulation, resolution, colour alignment and colour purity are all of the highest order, leading to a display that you can see is special straight away.

PCW April '99, p182

Price £276.13 **Contact** CTX 01923 810800 **Also Recommended** ADI MicroScan GT56 **Price** £363.08 **Contact** ADI 0181 327 1900 (PCW April '99)

Modem

Pace 56 Solo

The 56K modem not only performed well in our speed tests, but also has some of the best features we have seen on this type of product. It can work as a standalone answering machine and will also store faxes when your PC is switched off. The memory is upgradable to 6Mb and it can even phone you back at a remote location.

PCW August '99, p191

Price £164.50 **Contact** Pace Communication UK Tel 0990 561001 **Also Recommended** 3Com Professional Message Modem **Price** £149 **Contact** 3Com UK 0800 225 252 ◆ Diamond Multimedia Supra Express 56e Memory **Price** £99 **Contact** Diamond Multimedia UK 0118 944 4444 (both PCW August '99)

Removable storage

Iomega Jaz 2

If you need top performance and storage capacity, then Iomega's 2Gb Jaz drive is the only one to go for. Its speed makes it ideal for a wide range of applications, while the Jaz media feels more solid than most and is fully compatible with 1Gb cartridges. In short, it represents good value for large storage capacity.

PCW June '99, p168

Price £299 **Contact** Iomega 0800 973194 **Also Recommended** Panasonic LF-D101 **Price** £351 **Contact** Panasonic 0800 444220 (PCW Oct '98)

Sound card

Creative Labs SoundBlaster Live!

SoundBlaster cards have long been the best choice for non-professional users. The SoundBlaster Live! ups the ante, providing near-professional quality sound at a bargain price. And it comes with an impressive bundle of dedicated digital I/O daughtercard, speakers, subwoofer and games.

PCW December '98, p92

Price £149 **Contact** Creative Labs 01189 344744 **Also Recommended** Terratec EWS64 S **Price** £149.23 **Contact** Terratec 01600 772111 (PCW July '98)

Graphics card

ATi All In Wonder 128

Using ATi's Rage 128 chipset, the All In Wonder 128 provides the ultimate video solution for your PC. Besides sporting a fast processor with 32-bit colour in 2D and 3D applications, there's also motion compensation support for smooth MPEG2 decompression and the ability to capture video. But most impressive is the built-in TV tuner that allows you to watch TV while you're word processing.

PCW July '99, p78

Price £146.88 **Contact** ATi 01628 533115 www.atitech.com **Also Recommended** ATi Rage Fury **Price** £123.38 **Contact** ATi 01628 533115 www.atitech.com (PCW May '99) ◆ Matrox Millennium G400 32Mb Max **Price** £186.82 **Contact** Matrox 01753 665500 (PCW August '99)

Accounting

Intuit
Quickbooks 6

Touted as the easiest accounting package for small businesses, QuickBooks has a long history and a large user base. Version 6 is the first 32-bit incarnation. It even monitors company performance and sounds the alarm should you fall behind.

PCW March '99, p92

Price *£199 (Pro version)* **Contact** *Intuit 0800 585058* **Also Recommended** *MYOB* **Price** *£229.13* **Contact** *Bestware 01752 201901* ◆ *TAS Books* **Price** *£116.33* **Contact** *Megatech 01372 727274 (both PCW June '98)*

Personal Finance

Microsoft
Money Financial Suite 99

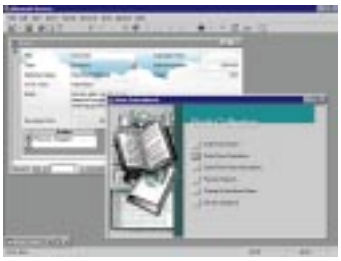
Microsoft Money Financial Suite 99 is our choice for personal finance. It offers online banking and updating facilities, as well as Sage compatibility, all at a bargain price.

PCW February '99, p80

Price *£49.99* **Contact** *Microsoft 0345 002000*
Also Recommended *Quicken 98* **Price** *£39.99* **Contact** *Intuit 0181 990 5500 (PCW June '98)*

Database

Microsoft
Access 2000



This industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 2000 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.

PCW November '98, p220

Price *£299* **Contact** *Microsoft 0345 002000*
Also Recommended *FileMaker Pro 4* **Price** *£169*
Contact *FileMaker 0845 603 9100 (PCW November '98)*

DTP

Adobe
InDesign

Seamless integration with PhotoShop and Illustrator, as well as multi-line text formatting, make InDesign a serious contender to knock QuarkXPress off its professional DTP throne. Time-saving features and a competitive price make it an attractive proposition.

PCW August '99, p87

Price *£468.83 (£399 ex VAT)* **Contact** *Adobe 0181 606 4000*
Also Recommended *QuarkXPress 4.0* **Price** *£816.62* **Contact** *Quark 01483 451818 (PCW June '99)* ◆ *Adobe PageMaker 6.5 Plus* **Price** *£351.33*
Contact *Adobe 0181 606 4000 (PCW August '99)*

Image Editing

Ulead
PhotoExpress 2.0

Ulead has succeeded in removing the frustration factor often involved in getting to grips with digital pictures. PhotoExpress 2.0 is a pleasure to use, with a clearly structured interface and fast, in-depth tools. It has pre-set editing modes for the novice and custom adjustments for each editing function, so the power user will be kept happy, too.

PCW January '99, p202

Price *£34.95* **Contact** *BIT 01420 83811* **Also Recommended** *Adobe PhotoDeluxe 3* **Price** *£45.83* **Contact** *Adobe 0181 606 4001* ◆ *Paint Shop Pro 5*
Price *£69.95* **Contact** *Digital Workshop 01295 258335 (both PCW January '99)*

Drawing

Adobe
Illustrator 8

Illustrator has once again gained the top spot amongst drawing packages through its introduction of bold creative tools like the new Pencil Tool, Art Brushes and the Gradient Mesh Tool, to name but a few.

If Adobe's new page layout application, InDesign, takes off, the productivity gains from interoperability between InDesign, Photoshop and Illustrator will be hard to resist.

PCW September '99, p165

Price *£257.32* **Contact** *Adobe 0181 606 4001 www.adobe.com*
Also Recommended *CorelDraw 9* **Price** *£327.82* **Contact** *Corel 0800 581028* ◆ *Sierra Windows Draw 7* **Price** *£39.95* **Contact** *0118 920 9100*
www.sierrahome.com (both PCW September '99)

Information Managers

Starfish
Sidekick 99

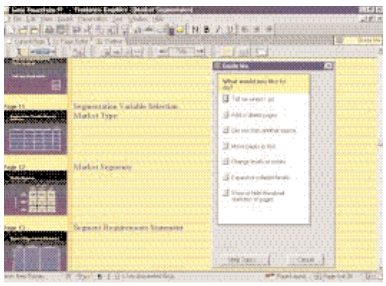
The best personal information manager boasts wide customisation abilities as its greatest strength. However, if you need heavyweight contact management, look no further than Goldmine 4 (*see the details panel, below*).

PCW August '99, p176

Price *£39.99* **Contact** *Starfish 0181 875 4455*
Also Recommended *Goldmine 4* **Price** *£229* **Contact** *AVG 0171 335 2222 (PCW August '99)*

Presentation Graphics

Lotus
Freelance Graphics



Lotus' offering is our choice for electronic presentations. However, your decision may rest on which office suite you own or are considering, and as part of Office 97, PowerPoint won't let you down.

PCW March '98, p200

Price *£49.35* **Contact** *Lotus 01784 445808*
Also Recommended *Microsoft PowerPoint 97* **Price** *£325.47*
Contact *Microsoft 0345 002000 (PCW March '98)*

Remote Access

Traveling Software
LapLink Professional

The high-end version of this extremely versatile product, LapLink Professional, has all the features of the standard version but also lets you print from the host machine onto a remote printer, or vice versa, and talk to whoever is using the host machine. It includes anti-virus and hard-disk cloning utilities.

PCW October 99, p134

Price *£176.19* **Contact** *Traveling Software 0800 374849*
Also Recommended *Symantec pcAnywhere* **Price** *£169.20*
Contact *Symantec 0171 616 5600 (PCW October '99)*

Web Design

Macromedia
Dreamweaver 2

An attractive and easy-to-use interface makes this great for those looking for something with a little more power. Good table handling and extensive formatting options on a single, centralised property inspector, make it a joy to use.

PCW April '99, p103

Price *£229* **Contact** *Computers Unlimited 0181 358 5857*
Also Recommended *Adobe PageMill 3.0* **Price** *£92.83*
Contact *Adobe 0181 606 4000 (PCW March '99)*

Programming Tool

Inprise
Delphi 4

Delphi is not a cross-platform product, but does let you build browser-independent web applications. It reaches all the way from RAD business applications to fast graphics using DirectX. It beats Visual C++ on ease of use, and Visual Basic on performance.

PCW April '99, p198

Price *from £92 to £1,845* **Contact** *Inprise 0118 932 0022*
Also Recommended *Symantec Visual Cafe* **Price** *£217 or £580*
Contact *Symantec 0181 317 7777 (PCW April '99)*

Anti-Virus

McAfee
VirusScan Platinum

McAfee VirusScan Platinum's background scanning checks mail attachments, internet downloads and even ActiveX and Java applets for comprehensive protection.

PCW July '99, p86

Price *£59.95* **Contact** *Network Associates 01753 827500*
Also Recommended *Dr Solomon's HomeGuard* **Price** *£29*
Contact *Dr Solomon's 01296 318700 (PCW April '98)*

hands on

contents

October's *Hands On* kicks off with some advice for those worried about whether or not their important information will still be accessible at the turn of the century. Mark Whitehorn's tips will help you work out the millennium issues in your **database**, as – with just three months left to run – the countdown to 2000 reaches boiling point [p216].

With 2000 in the air, it's also time for developers to start thinking about how the **next version of Windows** will affect their work [p256], and Tim Anderson has the low-down for you.

Away from the desktop, Mark Whitehorn watches as two **PDA operating systems** slug it out and declares one of them the winner. Find out if it's WinCE or Symbian [p230].

There's also the usual crop of expert advice, tips and tricks, from **making more space** on your PC [p220] to learning the latest in **web languages** [p224].

As ever, if you have any comments, questions or suggestions, feel free to send them direct to the writers, or address them to myself.

NIGEL WHITFIELD, HANDS ON EDITOR
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Colour co-ordinated

Ken McMahon takes you through the dos and don'ts for getting the best from your colour printer.

Printing can be a frustrating business. Getting any kind of result from some printers, colour or mono, is often such a stressful experience that it's tempting to live with less than perfect results. Unintentionally cropped pictures, landscape pictures printed on portrait paper, poor-quality pictures suffering from bad pixelation, washed out colour, no colour at all – the list of potential cock-ups is lengthy.

But it doesn't have to be this way. An understanding of the way your computer and printer deal with images, careful set-up of output options and printer driver settings, and a bit of occasional maintenance will see your colour output improve beyond measure.

Resolution

Even if you bought your colour inkjet for serious business use, the chances are it won't be long before you get around to printing out a selection of your favourite holiday snaps, or invites to your local Lodge's apron-embroidery evening.

The first step to producing crisp, sharp photos on your inkjet, without having to wait all day for them, is understanding resolution. All digital images are made up of thousands of dots called pixels. Resolution is a measure of the number of pixels in an image, usually expressed as dots per inch (dpi) or pixels per inch (ppi).

If you double the size of an image its resolution will halve, and vice versa – because you are spreading the same number of pixels over a larger area. By increasing the image size and reducing the resolution, the picture quality gets worse and worse – to the point where you can see the individual pixels that make up the image.

▲Fig1 72ppi images optimised for screen use can have their resolution doubled to 150ppi – check the 'constrain file size box' and their size will halve

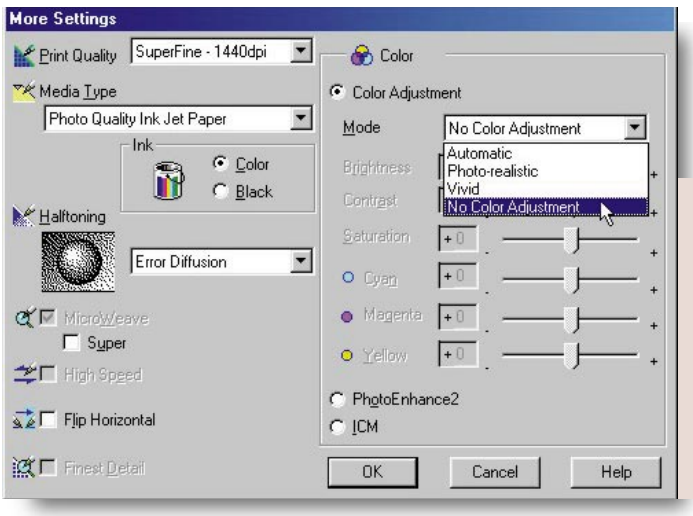
Your photo-editing package will have a feature that allows you to alter the resolution and will look something like this [Fig1] in Adobe Photodeluxe. Whether your photos were taken on a digital camera, supplied on disc by a processing lab, or scanned by your own fair hand this panel will tell you the overall image size and the resolution in pixels per inch.

To make the most of the capabilities of an inkjet your pictures need to have a resolution of around 150ppi at the size you are going to print them. Often, you'll find that your pictures have a much larger overall physical size than you need, but the resolution is only 72ppi because they are optimised for screen display.

Usually, doubling the resolution to 150ppi (and, therefore, halving the image size) is all you need to do. You must make sure to check the 'maintain file size' box as otherwise the program will add pixels by interpolation (making a guess based on the colour values of adjacent pixels and sticking new pixels in the middle of existing ones).

Once this is done, if the image is still too big (at about 18cm x 6cm you can fit two on an A4 page with plenty of margin) you'll need to make it smaller. Open the size dialog box again and, this time with the maintain file size box unchecked, type in the required finished size and click OK. This time you've actually removed some pixels from the image to make it smaller and your picture is now the required size and resolution for printing.

Remember, the optimum size is around 18cm x 6cm at 150ppi. Anything less than this and picture quality will begin to suffer. Higher resolutions will not noticeably improve picture quality, but images will take up more space on your hard drive, take longer to display on screen and much longer to print out.



◄Fig 2 Turning off so-called print enhancements in the printer control panel may actually improve image quality

Output settings

Failure to make sure all your output settings are correct is possibly the most

irritating printing foul-up of all. First check the paper size and orientation are correct. If your application warns that the image will not fit on the paper it's a fair bet that this is the problem. Also, if you have more than one printer connected, say a mono laser as well as a colour inkjet make sure you have the correct printer driver selected.

Next make sure you have the correct settings for the paper you are using. Some printer drivers, Epson, for example, automatically configure the driver for the type of paper you have chosen, but you still need to make sure that if you are using plain paper the driver isn't set for photo quality glossy film.

In any case, you may want to override some of the default settings. It pays to do some experimentation and compare the result of different halftone and colour adjustment modes. In my experience, in the absence of a colour management system, the best results are achieved with any so-called 'enhancement' options (photo-realistic, more vivid colours etc) turned off [Fig2].

Lastly, it's always worth looking at the print preview.

▼SAME PICTURE, DIFFERENT RESOLUTIONS. CLOCKWISE FROM TOP LEFT 200, 150, 100 AND 50PPI. PRINTED ON AN EPSON STYLUS PHOTO EX. (IMAGE FROM PHOTODISC: WORLD LANDMARKS AND TRAVEL)

SPRUCE UP YOUR DOCUMENTS

It's not all about pictures, What about reports, stationery, flyers or anything that involves text, charts, diagrams and the like? Here are some design pointers to help you achieve maximum impact.

- Avoid large areas of dark solid colours – use a percentage tint instead.
- Create richer looking blacks by mixing in 30 per cent cyan.
- To avoid banding, don't use graduate fills over small areas.
- Don't colour type that is smaller than 10 point
- If you do use coloured text, use dark coloured text (say, dark blue, or burgundy) on a light coloured tint panel (say, 20 per cent yellow).
- To make panels or pictures abut the edge of the page, use a smaller than A4 page size and overhang or 'bleed' the object over the edge of the page, then trim to the finished size.
- If your document has a fold (say, A4, folded to A5), avoid printing anything (especially solid colours) in the fold area.
- If printing over a photograph, choose an area of consistent highlight or shadow and choose a contrasting type colour. Alternatively 'knock back' the picture to a tint (using your photo editor's brightness and contrast, or levels).

Paper and cartridges

There are two important questions to be answered here. Why is special paper for inkjet printers so expensive and why are inkjet cartridges so expensive? The answer to both questions is they needn't be. I've had no trouble whatever using non-branded paper and cartridges in a range of Epson and Canon inkjet printers and feedback from other users backs this up.

Paper, however, is less straightforward. While using non-branded paper certainly won't do any damage, finding paper that produces good results is another matter. Ordinary photocopy paper (used on the plain-paper setting) produces fair results, but won't do your photos justice because the printer can't print at it's full resolution.

I've tried various types of coated paper supplied by commercial printers (the smooth surface is achieved by adding china clay), and none worked satisfactorily. I have, however, had perfect results using specially-coated inkjet paper from suppliers who advertise in PCW and elsewhere. It's available double-sided (most branded photo-paper is single sided) and typically costs less than a quarter of the branded papers.

Cleaning

If, despite everything else, print quality is still markedly less than you'd expect, the trouble could be one or more blocked nozzles on the printer. This often manifests itself as vertical ink trails, patchy solid colours or weird colour casts. It can usually be cured by a button on the printer itself or via a utility application, accessed by selecting the printer's control panel from the Start menu, then right clicking the printer icon and selecting properties.

Some manufacturers also provide a test pattern that you can print to check if all the nozzles are unblocked. It's worth printing this after you've performed the cleaning operation, as nozzles that were blocked can remain so.

PCW CONTACTS

Ken McMahon welcomes your feedback. Contact him via the PCW editorial office, or email graphics@pcw.co.uk

Database dilemmas

MONTHS TO GO!

Mark Whitehorn opens up Pandora's box while checking on database compliancy.

While it may not always be obvious, databases are often one of the most crucial tools in business. Assuring that millennium compliance has been achieved is therefore essential, as there are several ways in which the Y2K problem can threaten your database.

The 'bug' can strike at:

- The hardware.
- The OS.
- The RDBMS.
- The application.

The first two have been covered already in this series. However, it is worth remembering that many database applications use the current date as a default value in one or more fields. This value is typically picked up from the local machine, so in client-server systems make sure that both the server and all the clients are Y2K-compliant.

The RDBMS

By now, the current versions of all mainstream RDBMSs should be Y2K-compliant, so all you have to do is to upgrade to the most recent version. Yeah, right! Back in the real world, upgrading an RDBMS is often a complex and expensive step, so many sites run several versions behind and leapfrog occasionally up the version numbers. Even worse, some products allow multiple RDBMS engines to use shared data, so it is conceivable that you may be running several versions concurrently. Given that you may not be able to upgrade in time, check your supplier's website and you should find information about the compliance of earlier versions, for example: *www.microsoft.com/technet/year2k/product/product.asp*

Some companies may supply patches to pull older versions into compliance without the need for a full upgrade.

Date windows

We'll use Access as an example because it is so popular. However, the principles covered here apply to other RDBMSs, both stand-alone and client-server.

▲ MICROSOFT LISTS THE YEAR 2000 READINESS OF ITS APPLICATIONS ON ITS WEBSITE

Access has always stored dates as date values – as numerical values rather than strings. For example, the value 34,001 stored in a date field equates to one and only one date – 1/2/1993 – so in that sense, Access has always been Y2K compliant. But it isn't quite as simple as that (it never is) because the way in which Access interprets any two-digit date varies with the version of the product you are using.

Access 2000 and Access 97 use a date window to interpret dates entered in two-digit format. This assumes that dates between 1/1/00 and 31/12/29 are in the years 2000 to 2029, whereas those between 1/1/30 and 31/12/99 are in the twentieth century (ie from 1930 to 1999).

Access 1.0, 1.0a and 2.0 don't use a date window at all: every two-digit date is assumed to be in the twentieth century. And as for Access 95... well, it depends on the version number of a .dll file called OLEAUT32.DLL. If it is 2.20.4054 or greater, then Access 95 displays one behaviour, if it is lower than 2.20.4054 it displays another.

Both Office97 and Windows NT may have installed updates of OLEAUT32.DLL onto the system. There isn't space here to detail all the variations, but basically it is a mess (and there is nothing to suggest that Access is any worse than any other RDBMS). Different products handle this differently, even those from the same company. You will be delighted to know, for example, that SQL Server 6.5 assumes that values less than 50 are dates in the 21st century, and those greater than or equal to 50 are in the 20th. SQL Server 7.0, however, has an administrator-configurable option for the date window.

Clearly, one way around this problem, despite the very human desire to use two-digit dates, is to force users to enter dates in four-digit mode. Every version of Access interprets these in the same way.

The application

Each database engine will have its own default way of handling dates, but there is usually a database application that sits between the user and the engine, developed with some kind of tool (perhaps C++, VB or the interface part of Access). That application is capable of manipulating the user input data before it is sent to the database engine. One option is therefore to modify the program so it deals only in four-digit dates.

Stuck in the nineties

In the early nineties there were at least 20 RDBMS engines, many of which are no longer with us. But what if you have a database application that was developed using one of these?

- You can apply to a user group (if in existence) to see if it has been checked or if patches are available.
- You can test it yourself.
- You can upgrade to a newer product.

Databases are one of the more problematic areas for Y2K – and the most complex ones will need a lot of work.

PCW CONTACTS

Contact Mark Whitehorn via the PCW editorial office or email database@pcw.co.uk

The worm turns

Your email armour will always have chinks, says Nigel Whitfield, but you can boost its protection.

Email is a critical part of the internet, but it's also becoming apparent to many people that it can be a tremendous problem. The last few months have seen email move from a means by which viruses can be spread – and it's never been a good idea to run strange executables, or anonymous Word files – to a core part of the virus writer's strategy. Melissa and Worm.ExploreZip were programmed to hook right into the mail interface of your computer and send themselves on.

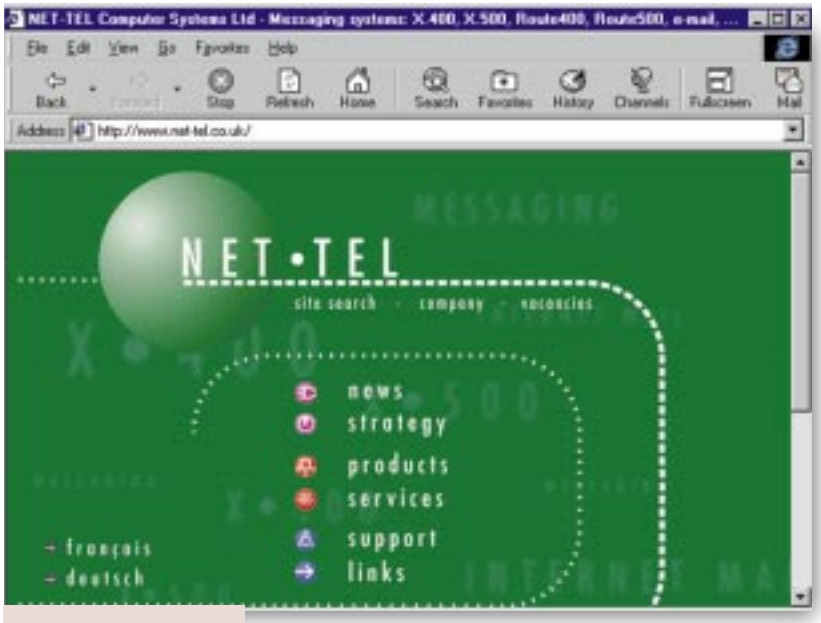
Viruses aren't the only problem for email users, though. It takes surprisingly little effort to forge email on the internet – a fact that's not lost on spammers, and an alarming number of ISPs and companies still have mail servers that can be used by anyone. One major UK ISP suffered tremendous problems recently as a result of a spam attack on its servers, causing a raft of complaints from its users.

Even when a mail server's been secured against random spam, it's still very often a trivial task to forge email and make it look like it's come from another user of the same service. And that means there's considerable potential for creating havoc, from simple malicious comments to someone trying to pass themselves off as you.

What can you do about this? Well there's no single answer, but there are lots of different solutions, depending on your situation.

For personal users, who want to make sure that they're immune from the worst of the email worms and viruses, there are a number of things you should do.

The facetious answer would be 'use Unix or a Mac,' since many attacks use the Windows MAPI system to send copies of themselves, or of other documents, to people in your address book. Of course, that's not a reasonable solution for some people, but you can take steps to protect yourself.



▲ NET-TEL'S TRUSTEDPATH CAN HELP STOP THE SPREAD OF SELF-EMAILING WORMS AND VIRUSES

Firstly, install and keep up-to-date anti-virus software. But don't believe it'll always spot problems. It won't – as many people have recently found to their cost. Always be careful about file attachments, no matter whom they appear to have been sent by. And 'say no to Word files or executables' is a good rule of thumb.

There are formats like RTF and SYLK that can be used to exchange data between systems, without running the same risk that macro-carrying formats such as MS Word involve.

An alarming number of ISPs and companies have servers that can be used by anyone

You could also do worse than download Mail Guard TrustedPath; it's a plug-in for the Windows messaging system that's free for personal use, and can be configured to prompt you before any mail is sent from your system – so a worm or virus can't mail things out without you being aware that it's happening, and having the option of stopping it. You'll find more information at www.net-tel.co.uk.

If you're running a company mail server, then there are more steps you can take. Make sure you don't have an open SMTP relay, so that people can't send spam via your service. There are many solutions depending on your mail software; you'll find some clues at maps.vix.com/tsi/ar-fix.html, which covers a range of mail systems.

And if you run a mail system that allows it, then you should really be scanning all incoming attachments, and making sure they don't contain anything nasty. Educating your users about what types of attachment they should use is important too.

When it comes to the other problem – authentication – there's little chance of all the internet's servers changing swiftly to a standard that allows proper verification of who's sending a message.

That means that if you do want to be absolutely sure of the identity of people, you need to use something that works

Questions & answers

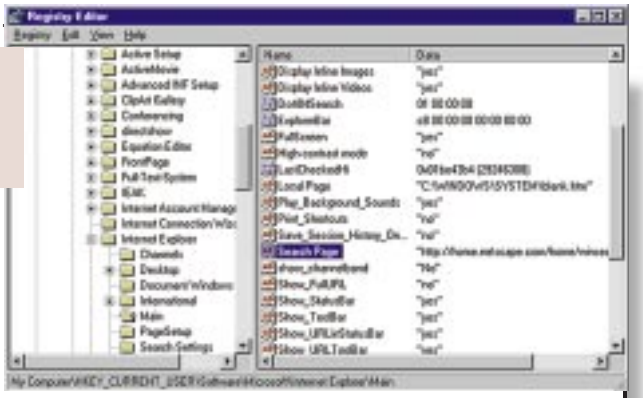
Q In my email program, I have the option of using IMAP or POP3 to retrieve messages. What is the difference, and which one should I be asking my ISP for?

A ***The simple answer is that your ISP probably won't give you a choice – it's likely to be POP3 or nothing, unless you have a very specialised service. POP3 is designed for retrieving messages and transferring them to a different computer. There are some options that some servers offer for sending mail via POP too, but you don't find them very often. IMAP, by contrast, can do an awful lot more. You can use it in much the same way as POP3, retrieving your email from a remote server, but it will also support lots of other features. For example, IMAP allows you to have folders of messages on the server, and it gives you much more flexibility over handling attachments. There are even options for synchronising messages between a remote mailbox and one on the server. All that, however, is more than most ISPs offer – in fact, I can't think of any that do offer IMAP as standard. So while your mail program gives you a choice, it's unlikely that, outside of a corporate network, you'll get the opportunity to choose anything other than POP3.***

Q Is there a way to customise the search button in Internet Explorer version 4 & 5? I work mainly on the lab intranet and need to set it up so that the search button accesses our intranet webserver's search page rather than Microsoft's search page. This was simple in version 3, but I am unable to locate the setting since version 4.

A ***Yes, it's a fairly simple thing to do, though not as straightforward as in other versions. You'll need to edit the Registry, using Regedit, and change the Search Page entry, which you'll find under HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Main. Set it to the URL of the page you want to use to search. As ever, be careful when editing the registry and don't do it if you're at all unsure. Presumably burying a useful option like this in an inaccessible place is simply a part of the 'usability' improvements brought to us by the latest versions of the web browsers.***

▸ BY USING REGEDIT TO POINT TO THE URL OF YOUR CHOICE YOU CAN PICK THE SEARCH PAGE YOU WANT TO GO TO



Q When we use our email system at work, most people use the full address which, as you can see ends up being quite long! I use just the user name and host name which seems to work fine, for example boss@mri1 or network@central. How far does this go? Could I email other NHS Trusts using john@accounts.CBHT rather than john@accounts.CBHT.nhs.uk

A ***I'm afraid you probably can't go any further than your local organisation – though it will depend to some extent on how your mail and domain lookup systems are configured. But as a general rule of thumb, when the system looks up an address, if there's no fullstop in the hostname, it will be assumed to be a local one, and the local domain will be added to the end. If there is a full stop, it will be assumed to be a Fully Qualified Domain Name (or FQDN), and verified against the main internet database as such.***

with ordinary email. At the moment, the best solution to this problem is probably PGP – Pretty Good Privacy – which allows you to digitally sign messages so that recipients, if they're using the same software, can verify that it's you. You can download a shareware version of PGP for a variety of systems at www.pgpi.com.

There are also other ways of verifying who you are, using digital certificates, such as the ones issued by BT Trustwise at www.trustwise.com.

To use all this technology, you'll need a decent email program – one that's capable of accepting attachments easily. And if you download PGP, you'll find that there are plug-ins for popular programs like Eudora, so that you can sign a message just with a couple of mouse clicks.

You might balk at the idea of moving to a different email program, especially if, like me, you have thousands of old messages archived. But, as the recent problems with Melissa et al have shown, while email may be the bread and butter of the Internet for many people, it's really not something you can take for granted.

Make sure the program you use is secure and reliable. Update your virus programs, and start to use digital signatures. And encourage other people to do the same.

The latest worm pretended to be a reply to a recent message that email correspondents had sent to you. You can never be 100 per cent safe, but if you're cautious about attachments, keep virus programs up to date, and only accept files from people who've signed their messages, you stand a much better chance of staying safe. Don't just rely on being lucky.

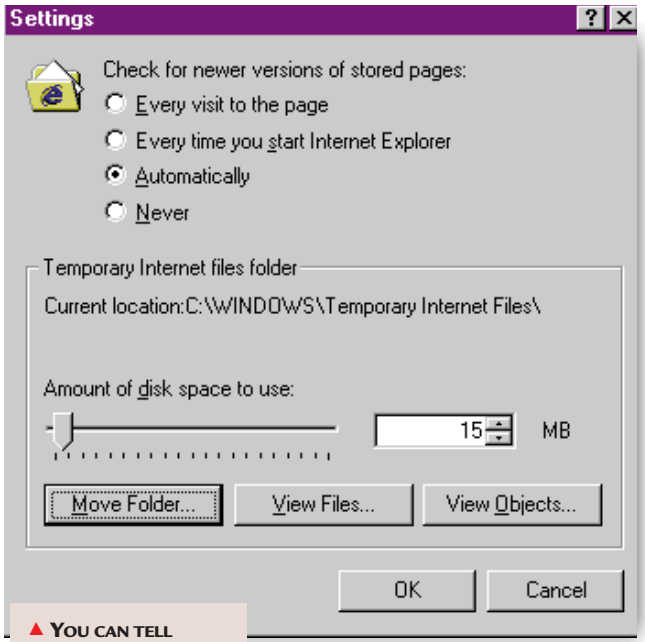
PCW CONTACTS

Nigel Whitfield welcomes your feedback on the Internet column. Contact him via the PCW editorial office or email internet@pcw.co.uk

Spaced out

Tim Nott says partitioning may keep volatile files away from the others but it also saves space on the C: drive.

Last month we looked at partitioning, with a view to segregating various types of static and volatile data on your hard disk – in particular changing the location of the swapfile and temp folder. There's much more you can move, which may also help you free up space on drive C:, should this be an issue. A prime candidate for relocation is the Temporary Internet Files folder, which is the Internet Explorer's cache for web pages. Moving this in IE5 is easy – right-click on the IE desktop icon (or go to Tools, Options on the IE menu). On the General tab you'll find a Settings button: this leads to another dialog, which has what we are looking for – a button labelled 'Move Folder'.

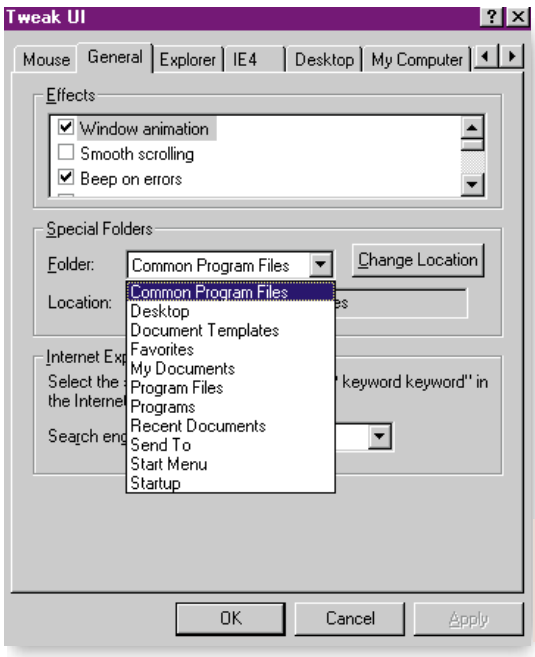


▲ YOU CAN TELL WINDOWS WHERE TO STICK ITS TEMPORARY INTERNET FILES

There are other special folders you can move with the aid of TweakUI. With the Windows 95 version, you can move the Desktop, My Documents, Document Templates, Favorites, and Send To folders. You can also relocate the Start Menu, and independently move components of the latter such as Programs, Recent Documents and StartUp. The Windows 98 version adds Program Files and Common Program Files. These locations – and others such as History – are stored in the Registry, under HKCU \Software \Microsoft \Windows \Current Version \Explorer \Shell Folders, but please note I have not experimented with editing these directly. I suspect that there may be good reasons for not tampering with the locations omitted from TweakUI. If you want to try doing so, then on your own head be it: the usual backup caveats apply.

Some badly-designed installations insist on being located in C:\Program Files

Although moving components off the Start Menu or Send To folder may seem rather trivial, the ability to move the Program Files and Common Program Files folders is extremely useful. As I mentioned last month, my preference is to keep applications on a separate partition, and as space on C: always seems to be tight I resist any attempts by installation routines to place programs here. I have come across some badly-designed installations that insist on being located in C:\Program Files. I've come across games that try to re-install every time you insert the CD as the Autorun routine looks in Program Files and 'thinks' it hasn't been installed. Suffice it to say none of these stay on my hard disk for long, but I think if I were setting up again from scratch, I'd move the Program Files folder to my Applications partition and save myself the grief.



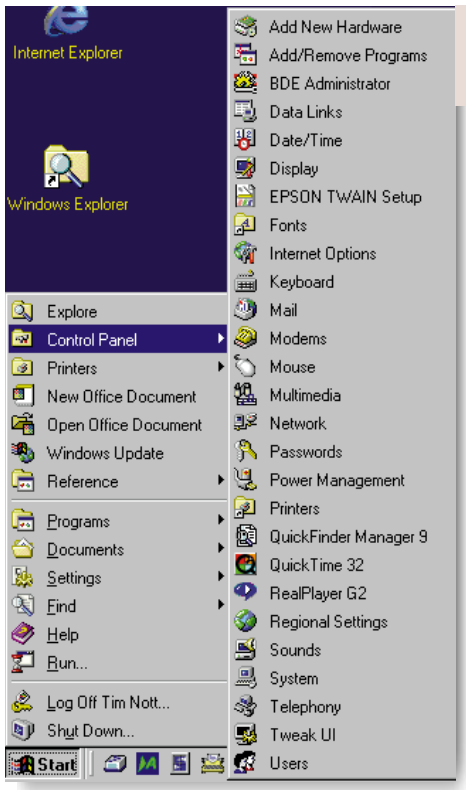
◄ SPECIFY FOLDER LOCATIONS WITH WIN 98 TWEAKUI

One excellent feature is the 'My Documents' folder, which made its debut with Office 95 but is now part of Windows 98. It can serve as a top-level container for all your type-two files – i.e. those you create in applications – as well as templates, user-defined dictionaries and other data you may want to back up on a regular basis. Note that under Windows 98 you can not only rename the desktop icon itself, but can also point it at any folder on your system, by right-clicking and selecting Properties. However, you should think very carefully before doing this – should you decide to change or rename the target folder you may also have to spend a lot of time changing application settings, template references in documents and so on. I've

long kept my data files in a folder (or directory as we used to say back then) called 'Words', as this is what it mostly consists of, and for the sake of consistency, I've renamed the 'My Documents' icon to 'Words' as well. The renaming affects both the desktop and Explorer icon, but you will still see the odd reference to 'My Documents' cropping up in Windows – usually these can't be changed as they are part of hard-coded system messages.

The Windows applets (and MS Office) automatically start a File Save/Open in the My Documents folder, and any applications you subsequently install should be set up to load/save files in an appropriate subfolder. Most recent applications do this without protest – older ones might still want to default to a sub-folder of their own installation. How you organise the data below is up to you. You may prefer to classify first by application – with second level folders for WP, spreadsheets, drawings, bitmaps, DTP and so on. Or you may prefer to classify by purpose or project. I tend to do a bit of both. If I'm doing a project, such as a group test for PCW, for example, I'll create a new folder for it in 'Words\PCW', which will have the text as a Word document, a comparison table in Excel, screenshots in TIFF or GIF and maybe a text file or two. I'll also put a shortcut to this folder in the QuickLaunch toolbar, or on the Desktop. Other things, such as Corel Draw artwork and CAD technical drawings I store by application, but again under a subfolder of 'Words'. By diligent struggling with Microsoft Word, I can get it to store my templates and user dictionaries in another subfolder, which is another step towards one-stop back-up.

Finally, it makes good sense (where possible) to avoid having lots of subfolders and files in the same folder. If you have, say, many subfolders under 'Documents\Letters', it makes sense to create a 'Misc' subfolder to contain those that don't fit into any particular category, rather than stick them straight into 'Letters' – you won't then have to scroll down past a heap of folders to open them.



◀ MENU OF THE DAY – ADDING CONTROL PANEL

Damn – missed!

What goes around comes around, and recently I've had a lot of mail either suggesting tips that have already appeared in this column or requesting repeats. So, I thought we could celebrate the 50th *Hands On Windows* 95/98 column with a top ten of golden oldies. Unfortunately I missed the boat – as this is the 52nd. But here they are anyway: thank you all for your suggestions and requests.

1 Clicking on column headings in Explorer's details view (e.g. date, size), sorts the files by that column. A second click reverses the order.

2 You can drag files into DOS windows, rather than type their names. Note that you must also click in the box afterwards to get the 'focus' for typing commands.

3 The Send To folder – an essential. Create shortcuts to folders and programs in here (C:\Windows\Send To...) and you'll save lots of time copying files to frequently used folders or opening them in a non-associated application.

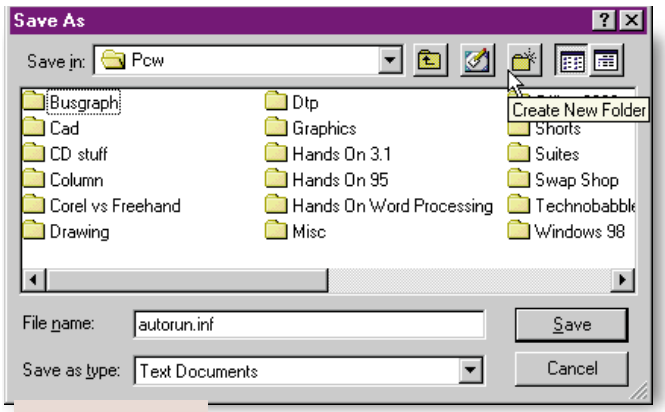
4 Control Panel – why not have this as a cascading menu from the Start Menu? Open the Start Menu and create a new folder. Give this the name 'Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}' excluding the quotes. The long extension will hide itself.

5 Dragging and dropping files – do you know which modifiers copy, move or create a shortcut and which is the default in all combinations of file type, source and destination? No – well neither do I. Instead, just right-drag and cho[redacted] the co[redacted]ext m[redacted] that app[redacted]

6 [redacted] No[redacted]

replacing the text to the right of the equals sign with a real path and file name. Save this as AUTORUN.INF in the root of the drive.

7 Create new folders on the fly when saving files. The little icon of a folder with a star at one corner in the standard Open/Save dialog does exactly that.



▲ NEW FOLDERS CAN BE CREATED WHEN SAVING

8 When browsing through nested folders, you can choose whether to open them in the same, or a new window, from View, Options (Windows 95) or View, Folder Options, Custom, Settings (Windows 98 or 95 + IE4). To get the best of both worlds, hold down the Control key as you open folders or go back up: this reverses the default setting.

9 **On a related note**, pressing Shift while closing a folder will also close all its ancestors.

10 **If you hold down** the shift key while restarting from the 'Shut Down Windows' box, the system will just reload Windows, rather than rebooting the PC.

Whoops!

If you are having difficulty getting August's wallpaper-stretching trick to work (which some of you obviously are), right-click on the desktop, select Active Desktop, and untick 'View as Web page'.

Further to the answer to Rohan Shenoy's question in August's Windows column, about creating right-click menu actions for all file types, there is an easy way. Look no further than Andrew Ward's Hands On NT column for July – 'Open with Notepad' – which works with Windows 9x as well. Thanks to several readers for pointing this out.

Questions & answers

Q How can I start Internet Explorer without connecting to the internet? Although I do use the internet, I often use IE to view HTML documents on my hard drive. Right-click, Open, on the IE5 desktop icon seems to do exactly the same as right-click, Open Home Page, and it's a drag to have to cancel the connection then choose 'Work Offline'.

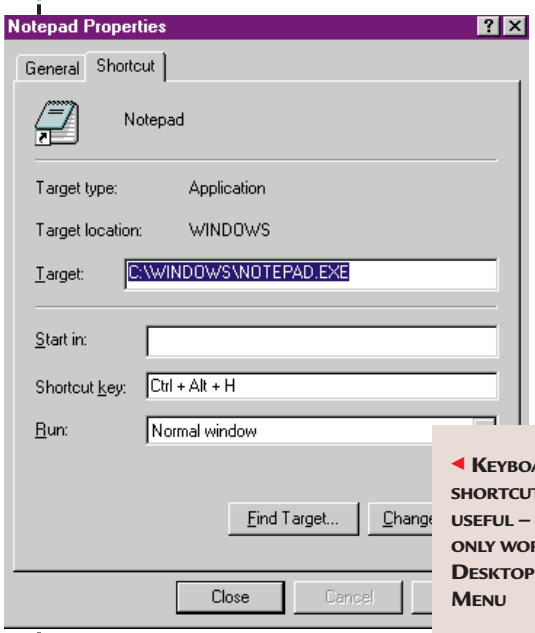
COLIN GREEN

***A** You can set your home page as blank or as a local file from General tab of the Internet Explorer icon properties. But if you want to keep your home page, the simplest is to create a blank text file on the Desktop and rename it with the .HTM extension. Double-click on this and it will load in Internet Explorer, without activating a dial-up connection.*

Q I'm a keyboard fan and have set up various shortcuts on my desktop with keyboard shortcuts. I wanted to assign other shortcuts to folders without cluttering up my desktop, so I created a folder in my Windows directory, and created the others in there. Unfortunately none of the key shortcuts that I've put here work, although the ones on the desktop still work fine.

RAJNISH BHASKAR

***A** This is, as they say, by design. Shortcut key combinations only work for shortcuts that are on the desktop or in the Start Menu hierarchy. If you Explore the Start Menu, you'll find you can right-click on the shortcuts therein, choose properties and assign key strokes.*



◀ KEYBOARD SHORTCUTS ARE USEFUL – BUT THEY ONLY WORK FOR THE DESKTOP OR START MENU

Q Recently my PC has started presenting me with the DOS-style boot menu every time I switch on. How do I return to the default of only seeing this if I press F8?

JILL DEAKIN

***A** The easy way is from TweakUI's Boot page – untick 'Always show boot menu'. If you don't have TweakUI (it's on the Windows 98 CD-ROM under Tools\Reskit\Powertoy), then you need to edit the file C:\MSDOS.SYS. See last month's Q and A for details – the line to change is Bootmenu=1, which should be changed to Bootmenu=0.*

Q Whatever happened to the Windows 95 'Send to any folder' PowerToy. It doesn't seem to be available in Windows 98 – is it hiding elsewhere? It was a very useful accessory.

ALAN WOOLEY

***A** There doesn't appear to be a Win 98 version of this, but the good news is that the Win 95 one appears to work fine.*

Q I copied the Windows 98 setup files from the CD-ROM to a partition on my hard disk, and now the PC thinks my E: drive is a CD – it runs the Setup program every time I click on it.

MIKE ELDER

***A** Sounds as if you've copied the Autorun.inf file as well – delete this from the root of E: and everything should go back to normal. You may also be wasting a lot of space – as there's a lot of surplus baggage in the Cdsample folder, such as 200 megabytes of video and sound advertisements. Simply copying the WIN98 folder off the CD should suffice.*

Q I search every month for all files that end with *.TMP. Last time I found in the Windows folder 390 TMP files that have filenames of the form: ffef585_{8E246A60-FB12-11D2-85EC-D7A2EEDD4A0D}.tmp. The files are empty (I opened them with Notepad, and they are 0kb). Is it safe to delete all these files, and what are they?

SALAR AL KHAFAJI

***A** I was as puzzled as you when I discovered that I, too, had a collection of these. The middle part of the file name looks like a Class ID as seen in the registry, but I couldn't find any matches. Examination of the file properties showed that they seemed to be created in pairs, at boot time. The culprit appears to be the Machine Debug Manager loading at start-up – this is a utility that comes with certain Microsoft development tools. I've deleted mine, and lived to tell the tale.*

PCW CONTACTS

Tim Nott welcomes your feedback on the Windows column. Contact him via the PCW editorial office, or email win@pcw.co.uk

Marked-up for death

With advances in XML and the introduction of XSL, Tim Anderson asks can HTML survive?

There are several reasons why you need to know about XML (eXtensible Mark-up Language). The first is that HTML is straining at the seams. Instead of hunting for the tag you need, and then checking which browsers and browser versions support it, why not define your own tag? This is what XML lets you do.

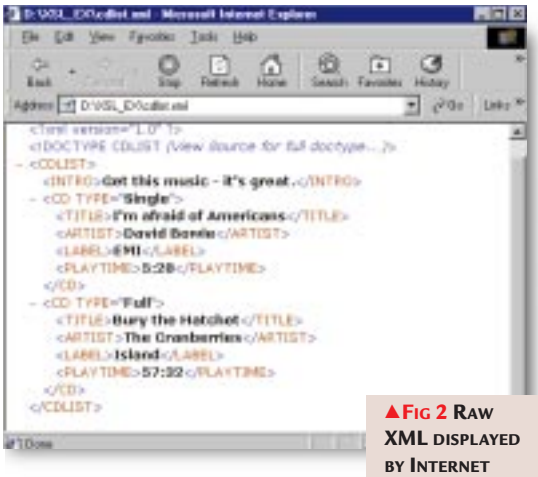
Secondly, XML has every chance of becoming the standard means of exchanging data, particularly across platform boundaries or over the Web. The great attraction of this approach is that it is both simple and robust. Take two applications that are able to generate and parse XML, add a means of transporting the XML data, and you have the essential ingredients of a distributed application. And last but not least, XML is a great way to handle documents.

An XML document is intelligent about its content, far more so than HTML. For example, in an HTML document you can tell what is body text, what is a list, and various levels of headings, although on a typical web page this scheme is likely to be subverted by the practicalities of web design. There may be body text in table cells, or headings might not use the built-in heading levels.

By contrast, an XML document can be much easier to understand. For example, a mark-up for a *Hands On* column could explain the different elements of the article, with text marked as key points, code examples, readers' questions, picture captions and so on.

XML can also include databases with records and fields, as well as separating structure, content and presentation. Documents can be transformed, either by processing or by use of XSL (Extensible Stylesheet Language). Transformation can take place either on the client or the server, so that you can use XML server-side while still presenting plain HTML to browsers.

You may wonder whether XML will replace HTML. The answer is 'sort of'. Nobody is planning to discard all the work that makes HTML a fine general-purpose mark-up language. Instead, HTML will eventually become an XML language. One implication is that web authors will need to tighten up their code, as XML is less forgiving about errors such as omitting closing tags.



▲ FIG 2 RAW XML DISPLAYED BY INTERNET EXPLORER 5

[FIG 1] A simple XML document

```
<?xml version="1.0"?>

<!DOCTYPE CDLIST [
  <!ELEMENT CDLIST (INTRO,CD*)>
  <!ELEMENT INTRO (#PCDATA)>
  <!ELEMENT CD (TITLE, ARTIST,LABEL,PLAYTIME)>
   <!ATTLIST CD TYPE (Single|Full)  #REQUIRED>
  <!ELEMENT TITLE (#PCDATA)>
  <!ELEMENT ARTIST (#PCDATA)>
  <!ELEMENT LABEL (#PCDATA)>
  <!ELEMENT PLAYTIME (#PCDATA)>
]>

<CDLIST>
<INTRO>
Get this great music.
</INTRO>
<CD TYPE="Single">
  <TITLE>I&apos;m afraid of Americans</TITLE>
  <ARTIST>David Bowie</ARTIST>
  <LABEL>EMI</LABEL>
  <PLAYTIME>5:28</PLAYTIME>
</CD>
<CD TYPE="Full">
  <TITLE>Bury the Hatchet</TITLE>
  <ARTIST>The Cranberries</ARTIST>
  <LABEL>Island</LABEL>
  <PLAYTIME>57:32</PLAYTIME>
</CD>
</CDLIST>
```

An eXaMpLe

Despite its name, XML is not itself a mark-up language but a way of implementing mark-up languages. Fig 1 shows a simple example of an XML document. This is a standalone document, which means it is fully self-describing. It begins with the XML declaration:

```
<?xml version="1.0"?>
```

which identifies this XML. What follows is in two distinct parts.

First, there is the DTD (Document Type Definition). This defines the mark-up language, which in this case is for creating lists of compact discs. More commonly, the DTD would be in a separate file referenced by its URL, but here it is included in full.

The DTD begins by naming the DOCTYPE, and then gives a list of elements – in other words, blocks of content – that are valid for this type of document. XML documents can have only one root element, which in this case is CDLIST.

The CDLIST element consists of one and only one INTRO followed by any number of CD elements – this is the meaning of (INTRO, CD*). The asterisk indicates the element may exist none or many times. The CD element has a TYPE attribute, which must be Single or Full, like an enumerated type, followed by several elements that describe each CD. Each element resolves down to #PCDATA, which means character data.

The second part of the document is

content – tagged according to the rules of the DTD. If you are familiar with HTML tags, it is easy to follow. Note that XML tags are case-sensitive. The whole content is enclosed in an opening and closing CDLIST tag, within which are a single INTRO element and two CD elements, as allowed by the DTD.

If you open the file in Internet Explorer 5, currently the only browser that supports XML, you will see it structured as in Fig 2. Note that IE does not fully validate the XML when it displays, although it will complain about some errors. A handy validator is available online at Microsoft's site, with example code for you to use IE 5's parser for validation.

Displaying XML

Internet Explorer's efforts in displaying XML in a tree structure are pretty, but not really the kind of thing you want users to see. There are, however, a number of ways to format XML for presentation.

One way is to create a second HTML document with a script that iterates through the XML and inserts its content into Dynamic HTML placeholders. Another method is to use XSL. When IE displays XML in the default view, it does so using a default stylesheet. You can provide your own stylesheet to customise the display. Fig 3 shows a simple example. To display the XML using this stylesheet, add the following line after the XML declaration:

```
<?xml-stylesheet
type="text/xsl"
href="cdstyle.xsl" ?>
```

Fig 4 shows the results in Internet Explorer. The important thing to realise is that a different stylesheet could display the same content in a completely different form. For example, you could use a table, or omit the label and playing time, or sort the CDs by title or by artist, or add extra text, simply by amending the stylesheet. Another point is that the displayed result is simple HTML, so if the parsing is done server-side it would be compatible with any browser.

[FIG 3] A simple XSL stylesheet

```
<?xml version="1.0"?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/TR/WD-xsl">
<xsl:template match="/">
<HTML>
<BODY BGCOLOR="AQUA">
<xsl:apply-templates select="//INTRO" />
<xsl:apply-templates select="//CD" />
</BODY>
</HTML>
</xsl:template>

<xsl:template match="INTRO">
<H3><xsl:value-of /></H3>
<HR/>
</xsl:template>

<xsl:template match="CD">
<P>
<xsl:apply-templates select="TITLE" />
<xsl:if match="CD[@TYPE='Single']">
<I>CD single</I><BR/>
</xsl:if>
<xsl:apply-templates select="ARTIST"/>
<xsl:apply-templates select="LABEL" />
<xsl:apply-templates select="PLAYTIME" />
<HR/>
</P>
</xsl:template>
<xsl:template match="TITLE">
<B><xsl:value-of /></B><BR/>
</xsl:template>
<xsl:template match="ARTIST">
<xsl:value-of /><BR/>
</xsl:template>
<xsl:template match="LABEL">
<xsl:value-of />.
</xsl:template>
<xsl:template match="PLAYTIME">
Playing time: <xsl:value-of />
</xsl:template>
</xsl:stylesheet>
```

Understanding the stylesheet

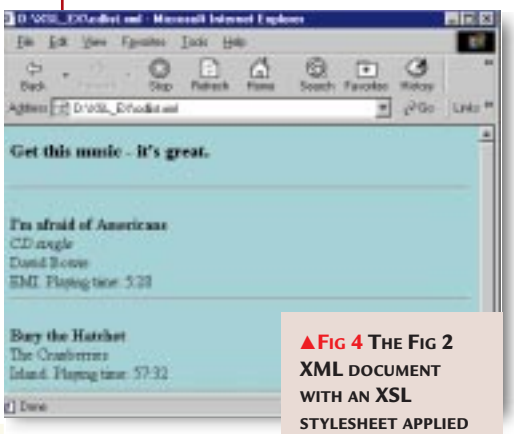
The stylesheet in Fig 3 looks at first sight like a jumble of HTML and XML. It is in fact an XML document which defines a series of 'xsl:template' elements. The 'xsl:' prefix indicates that these elements belong to the namespace referenced in the URL at the top of the document.

Each template element has a 'match' attribute that tells the parser which elements in the target XML document should be transformed. The first template has the attribute:

```
<xsl:template match="/">
```

which means the root element of the target document.

Within this template, other templates are applied, through the 'xsl:apply-templates' element. Specifically, it instructs the parser to apply first the INTRO template, and then the CD template to all matching elements. These templates are defined later in the stylesheet. The INTRO template uses the 'xsl:value-of' element to insert the INTRO data between opening and closing heading tags. The CD template uses a further set of 'xsl:apply-templates' elements to apply different templates for each sub-element. It also uses the 'xsl:if' element to inspect the TYPE attribute of the CD and print some conditional text.



▲ FIG 4 THE FIG 2 XML DOCUMENT WITH AN XSL STYLESHEET APPLIED

PCW CONTACTS

Tim Anderson welcomes your Web Development questions and comments, via the usual PCW address or via webdev@pcw.co.uk

- *http://msdn.microsoft.com/xml is a very good resource and tutorial for XML in IE 5.*
- *www.xml.com and www.xml.org are interesting sites with XML resources.*
- *www.w3.org is the W3C committee's site, with the latest on XML standardisation.*

An icon by any other name

Andrew Ward looks at how to name a machine so that users and administrators can find it.

The 'My Computer' icon is a regular bone of contention. Users naturally want to rename it to something much friendlier, but this causes no end of support issues when some poor helpdesk operative is asking the user to click on it. If they don't know the name, they're reduced to having to describe the icon and patiently wait while the user finds it. Michael Davies wrote in to suggest renaming it to include both the user name and the computer name, while retaining the words 'My Computer'. This neatly solves both problems, in that it has a recognisable name, while conveying something useful both to the user and to the support desk.

▲ USING A HELPFUL NAME FOR THE MY COMPUTER ICON CAN EASE SUPPORT PROBLEMS

You accomplish this via a registry hack, using regedt32, and not via renaming the icon on the desktop. Navigate to HKEY_CLASSES_ROOT\CLSID\{20D04FE0-3AEA-1069-A2D8-08002B30309D} and delete the existing <No Name> value. Create a new value and once again don't give it a name. Set the type to REG_EXPAND_SZ and click OK. When prompted for the string value, Michael recommends entering

```
"My Computer %USERNAME% :
%COMPUTERNAME%"
```

%COMPUTERNAME% and %USERNAME% are automatically replaced with the current user name and computer name. Obviously, either renaming the desktop icon or editing the registry and using the actual user and computer names would be unhelpful because, of course, these details may change.

By using this method, support desk personnel have a quick and easy way of finding out the current user name and computer name, while still standing a good chance of helping the user click on My Computer if required.

◄ THE OFFICE 97 TOOLBAR CAUSES A NUMBER OF PROBLEMS FOR NT USERS

Office Intrusion

The Microsoft Office toolbar may look pretty, but clicking on the Excel icon, for example, may actually cause Notepad to run – or in my case, create an email message with EXCEL.EXE as an attachment. These are just a couple of items related to Microsoft Office and its impact on Windows NT. For many users, the first thing they do after installing Office is to zap the FINDFAST process from the startup group and kill the office shortcut bar. Finally, there's some actual evidence to support at least the first of these actions beyond some faint suspicion that it impacts system performance and reliability.

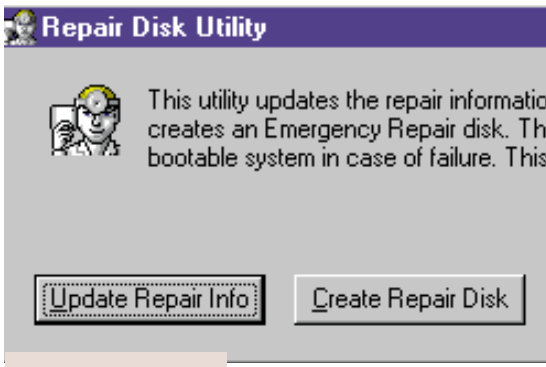
Microsoft has revealed a bug in Office 97 SR2 which causes the following error on all Windows NT 4 versions:

STOP 0x0000001E (0xc0000005,0 xa0055c99,0x00000000, 0x00000008) in WIN32K.SYS

To work around this problem, Microsoft suggests removing FINDFAST.EXE from the Startup group. Simple but effective.

James Stormont and several others (OK, many others) have complained that my suggested technique for persuading 'Open with Notepad' to appear at the top of the Explorer short-cut menu has an annoying side-effect. The Microsoft Office shortcut bar works on the (in this case, invalid) assumption that the first item on this menu will always be the application that is associated with that file type. Of course, if you put 'Open with Notepad' at the top of the list then that's no longer the case, and all that the Office shortcut bar ever does is open everything with Notepad!

As far as anyone can tell, it is only the Office shortcut bar that's affected – single-clicking document items on the desktop and any other activity still works as normal. This looks like another bug we can chalk up to Office 97; and although I have Office 2000 here, I don't have the nerve to install it to see if that suffers from the same problem.



▲ KEEPING YOUR REPAIR DATA UP TO DATE COULD SAVE YOU A LOT OF TROUBLE

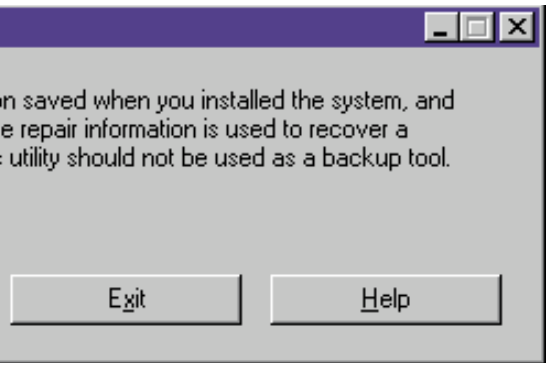
Beware the repair Disk!

Readers beware – RDISK doesn't normally save the SAM and SECURITY hives. A Windows NT repair disk can raise a lot of questions. As a reader discovered some months ago, if you don't keep it up to date you can be in big trouble. The problem is that it's not always possible to update it – as I mentioned a few issues back, mine is too big to fit on a floppy drive. In the past, I've suggested that you run RDISK to create a backup copy in the \repair folder

Clicking the Excel icon on the Office toolbar may actually run Notepad

on your hard drive. If the hard drive is still readable after a problem, or if you have a backup copy of it, then the NT boot disks can be used to recover the registry from this folder instead of the floppy disk.

However, I missed an important point. When you run RDISK, it doesn't usually save the SAM._ and SECURITY._ registry hives. There's a good reason for this: in Windows NT 4, user information is stored (rather unwisely) in the registry. If you have thousands of users, these hives could be massive and even when compressed by RDISK wouldn't stand any chance of fitting on a floppy disk. The good news is that when Windows 2000 appears (which could be about a month after you read this), all Active Directory information is stored within a JET database.



But for now, if you're reduced to using the hard disk backup method, or if you don't have too many users, then you'll definitely want to save these hives. Otherwise, you'll face hours of fun recreating user and group information, since the SAM and SECURITY hives saved in the /repair folder will only contain the default administrator account and the password used during Setup (and I hope you can remember what that was).

To back up these two additional hives, run RDISK with the /S option (it will also save the usual stuff). Following the backup, RDISK will ask you if you want to create an emergency repair disk. If you don't want to see that question then use RDISK /S- (note the minus sign after the S), and RDISK will exit as soon as it has finished saving the hives.

If you don't know whether you will run out of space on the emergency repair disk by using this technique, then first of all take a backup of everything in the \repair folder (the full path is <systemroot>\repair by the way). Then, after you run RDISK /S if you have a problem fitting the files onto a single disk, then you can reinstate the original \repair directory and abandon the idea of backing up SAM and SECURITY hives.

By the way, RDISK /S- is a useful way of getting the registry backed up if you are using a backup tool or medium that doesn't normally back up the registry. Before you run a backup, schedule RDISK /S- to run so that it copies the registry hives to your \repair directory, from where any backup program should be able to access them in the same way as any other normal file. Although the NTBACKUP program that comes with NT does backup the live registry, not every other backup program does. With the online backup service NetStore, for example, although the registry can be backed up this requires switching the program into 'all files' mode, whereby it backs up absolutely everything, necessitating many long nights of online time.

You'll definitely want to save these hives or you'll face hours of fun

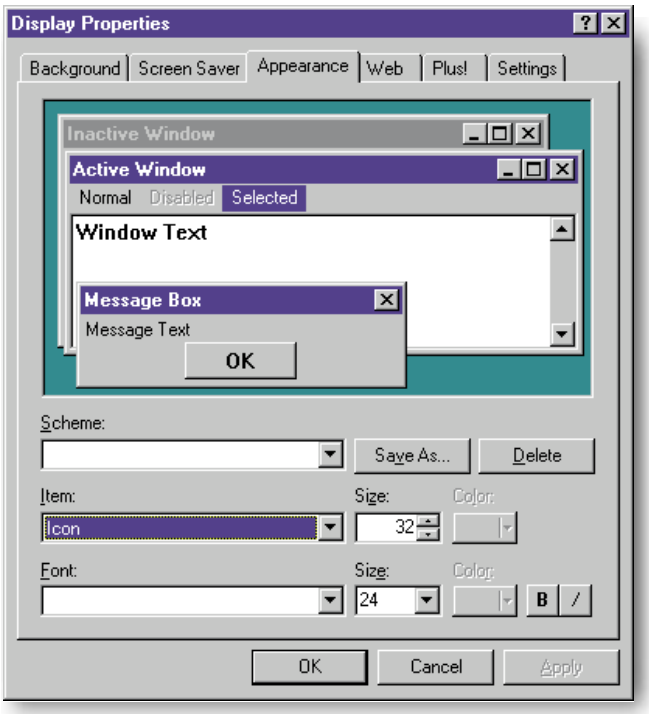
Dancing Icons

A frequent complaint from readers is that desktop icons don't stay where they're put. Tim Gathercole has suffered from this since a reinstallation of Service Pack 4; after a reboot, desktop icons don't remember their previous positions and reappear all lined up down the left-hand side of the screen. However, Tim has been able to throw a bit more light onto the issue. First of all, he suffers from the problem worst than most — his application windows don't remember their positions either. But he has also observed that if he closes all windows before closing down the system, then the desktop icons do remember their positions, and applications do start up with their windows in their previous positions.

The conventional answer is that the location of icons on the desktop is saved when you log out or shut down Windows NT. If the location of the icons has changed and the changes have not been saved, the previous positions are used; and you can force a save of the existing layout by clicking on the desktop and then pressing F5. Why would the changes not be saved? Usually, this is because Explorer is crashing at some point during the logoff/shutdown procedure (and this may or may not be apparent to the user). Alternatively, it's because for some reason Explorer is unable to write this information into the registry.

Active Desktop, Internet Explorer and TweakUI have all been suggested as likely culprits for interfering with desktop icons, so removing, disabling and/or reinstalling these can be worth a try. In particular, some people have a problem with TweakUI interfering with IE4 and causing icon corruption (rather than losing positions). The fix to this is to remove TweakUI and delete <systemroot>\ShellIconCache.

Interestingly, Microsoft also suggests you take the following step before you



delete ShellIconCache:
Open the Display control panel
Select the Appearance tab
In the Item box, select Icon
Increase the icon size by one
Select Apply
Decrease the icon size by one
Select OK.

Another interesting aspect to this problem, Tim says, is that on a second machine, while the same problem occurs, it only occurs for the user profile that was used to install the Service Pack.

Going for a drive

A quick note about the Windows NT Explorer. In many instances under Windows NT, drive C is not the main drive, but when you start up Explorer, drive C is usually expanded by default (that is, it looks as if you'd clicked on the + sign to open up the drive view). If your Windows system directory is on a different drive, then that drive would usually be the one expanded. However, many users would prefer to have a specific drive, or even no drive, expanded in this way. Here are two alternative command-lines that you can use.

This first starts up Explorer with no drive expanded at all:

```
<systemroot>\explorer.exe
/e,/root,,::{20D04FE0-3AEA-
1069-A2D8-08002B30309D}
```

Alternatively, this example opens up drive D instead of C:

```
<systemroot>\explorer.exe
/n,/e,D:\
```

Here is a full explanation of the command-line options for Explorer in Windows NT 4.0:

/n This opens a new single-pane window for the default selection (as if you'd opened it via the My Computer icon). This is usually the root of the drive which Windows NT is installed on. If the window is already open, then a new window opens.

/e This opens Windows Explorer in its usual view.

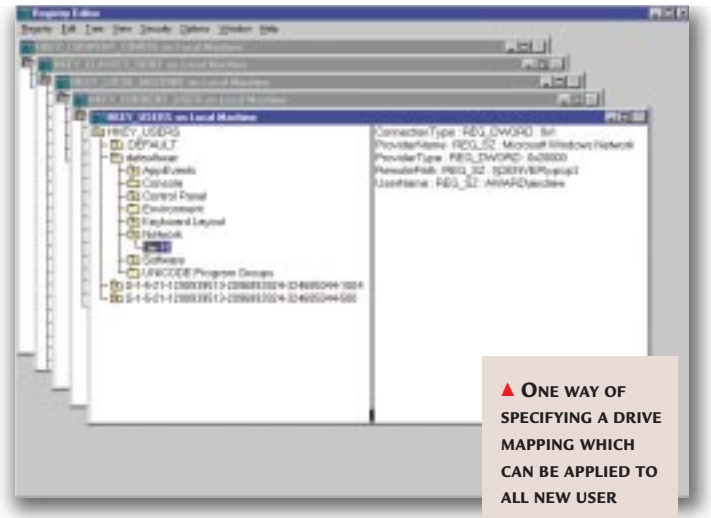
,/root,<object> This specifies the object to be used as the root of the view.

,/select,<object> This opens a window view of the parent folder and with the specified folder, file or application selected.

It is important to note that the /select option does not work if you choose the /e view, and that you have to precede the /root and /select options with a comma.

Default Desktops

Adrian Shephard would like to set up a basic default desktop for Windows NT Workstation systems, with pre-defined drive and printer settings. This would mean that when any new user logs in for the first time their drives and printers are mapped automatically.



▲ ONE WAY OF SPECIFYING A DRIVE MAPPING WHICH CAN BE APPLIED TO ALL NEW USER ACCOUNTS

Well, of course, one way to achieve this is for the network administrator to set up a logon script when creating the new user, but there is a way to configure a system (or domain) so that all new users automatically get particular settings without having to first create that script.

However, this is a rather messy procedure that involves extensive registry editing. An alternative method would be to use the System Policy editor, having first configured the template file appropriately.

When a new user logs on for the first time, the default user profile is used as the basis of their personal profile, so you have to start by editing the default user profile. This is stored as:

```
<systemroot>\Profiles\Default
User\NTUSER.DAT.
```

To make these changes, run the proper registry editor regedt32, go to the window called HKEY_USERS on Local Machine, drop down the Registry menu and select Load Hive. Navigate to the NTUSER.DAT file mentioned above.

Enter something suitable for the key name, for example 'defaultuser' (if you just use the word 'default' you are liable to get it confused with the key called .DEFAULT). Now, select the key name defaultuser within the window, and add a new key (using the menu option Edit, Add Key) with the name Network. Select the Network key you have just created, and add a new key under that with the drive name.

What you want to end up with is a key defaultuser\Network\H, for example, if the drive you want to be mapped is letter H. Now, create the values shown in Fig 1 using Edit, Add Value (The actual values you require may differ on your network, but you can find out what they should be by mapping a drive manually and inspecting the registry). Now, reselect the root of the hive (defaultuser) in the tree view, then in the Registry menu, select Unload Hive and Quit.

With any luck, when any new user logs onto that machine, they will have a new default drive mapping. It may be possible to leave out the UserName value to see if Windows NT will use the currently logged on user instead.

[FIG 1]

Value name	Type	Data
RemotePath	REG_SZ	UNC path to remote drive (eg \\DENVER\vpop3)
UserName	REG_SZ	A user with rights to the remote drive (eg \\DOMAIN\user)
ProviderName	REG_SZ	Microsoft Windows Network
ProviderType	REG_DWORD	020000 (in hexadecimal)
ConnectionType	REG_DWORD	1

PCW CONTACTS

Andrew Ward welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email NT@pcw.co.uk

Psion v WinCE

Microsoft looks set to blitzkrieg its way to a victory in the PDA war, says Mark Whitehorn.

Coincidentally, both the Symbian and WinCE developers' conferences were held within days of each other in June. Attending both seemed like a perfect opportunity to compare and contrast the development potential of both platforms. In turn I felt that this might allow me to deal with the 'ultimate question' that seems to be cropping up more and more frequently. The ultimate question has several forms, but they all boil down to the same thing:

'I want to buy the PDA that will ultimately survive, so should I buy a Psion or a WinCE machine?'

(I realise that Symbian and Psion are not the same company, but then they aren't exactly rivals either!)

I found an answer (and I promise it won't be 42).

The Symbian conference was held on a Thursday and Friday in London, the WinCE conference began in Denver on the following Sunday and ran till Wednesday. For a start, the sheer difference in size was boggling.

The entire Microsoft site is to move to a wireless network as an aid to the use of PDAs

How big?

The Symbian conference boasted about 426 attendees, 24 speakers' sessions and seven supporting artists (companies like Purple Software, which develop and sell software for the platform).

The WinCE conference claimed 2,000+ attendees, more than 90 speakers' sessions/labs and about 135 supporting artists.

So the WinCE conference was much larger and longer, a factor that is important because the more attendees and supporting artists, the more software is going to be developed for that particular platform.

Who were the attendees?

The suit/sandal ratio is a worthwhile indicator. A low suit/sandal ratio suggests that a conference is going to be fun and technical; a high ratio suggests that big business has become interested in the topic. The suits are looking for ways to make money that means some of the fun will be replaced by financial considerations. I reckon that the Symbian conference was low — enthusiasts were noticeable by their presence. However the ratio at the WinCE conference was stratospheric: so high that other attendees were, unbidden, commenting on the lack of open-toed footwear.

Which companies wanted to align themselves with which conference?

Ericsson, Motorola, Matsushita, Sun, Metrowerks, Nokia, Psion Enterprise, Psion Computing, Oracle, Sybase and ARM were at the Symbian conference and all the manufacturers of handheld devices (Casio, HP etc), together with IBM, Sybase, Oracle etc (in other words, lots of others) were at the WinCE conference.

So telecomms was well represented at the Symbian conference.

What did they want to tell us?

Psion talked about the new Psions — the 32-bit Series 5mx has a new half-VGA width back-lit screen, a stylus and a touch-type keyboard, 16Mb RAM, a CompactFlash card slot, a 36MHz ARM710T RISC processor. All of this is in a device weighing 354 grams and with a claimed battery life of a month on 2 AA batteries. There's also a Java Virtual Machine on the CD that ships with the Series 5mx. Wow.

If that wasn't enough there was the netBook, claimed to be the world's first truly mobile network computer, incorporating 100 per cent pure Java technology. This is more of a virtual device at present but promises, over time, to provide a range that will include a choice of quarter, half and full VGA resolution screens, pen and keyboard driven tablet and clamshell devices. The netBook features Psion's first implementation of colour on a full VGA screen, with pen-driven navigation and data input, together with a standard QWERTY keyboard. There's also a PC card drive and a slot for either a compact flash card or disk drive. Double wow.

The WinCE affair had two keynotes. Harel Kodesh, VP of Microsoft's Productivity Appliance Division, told the assembled developers what they wanted to hear – that they were the chosen ones. Predictably, this went down a storm.

Then he told them things like 'the emerging information appliance industry promises to enable form factors and scenarios that are currently not possible with today's software and hardware'. I was left wondering what exactly a 'form factor' was and whether the word 'scenario' wasn't due for a rest by now.

So far, a perfectly normal keynote from Microsoft, but then, without any warning at all, something of substance appeared. A 'demo' of Windows CE running on a petrol pump. The pump talks to the server in the station by email, from the station you can browse the state of the pump using TCP/IP and HTML.

Technically, the information was fascinating, particularly as we were assured that this wasn't vapourware, this was an operational system. But Kodesh spoilt it all by saying that the pumps 'revolutionise the consumer experience' — meaning that they showed the customer Coke advertisements while dispensing petrol (really, I'm not kidding). He clearly hadn't spotted the word 'developer' in the conference title. Then again, perhaps he had noticed the suit/sandal ratio...

Bob Muglia, senior VP of Microsoft's Business Productivity Group, gave the other keynote. He spoke mainly of the company's overall strategy, some of which actually had relevance to mobile computing, like the fact that the entire Microsoft site at Redmond is destined to move to a wireless network within a year. This is mainly as an aid to the use of PDAs on the site — which, as an aside, seems to indicate that Microsoft is genuinely interested in the use of PDAs and not just interested in selling WinCE.

So, Psion talked about new hardware; Microsoft, as it so often does, talked mainly in 'global terms', but it also demonstrated WinCE being used in a real life commercial application where it runs as an embedded system.

■ Where were the best toys?
Here there was no contest, the WinCE conference simply wins hands down with desirable toys, both hard and soft.

■ Which event had the best development tools?
If I were a professional developer for the PDA, there is no doubt which platform I would choose. WinCE scores again.

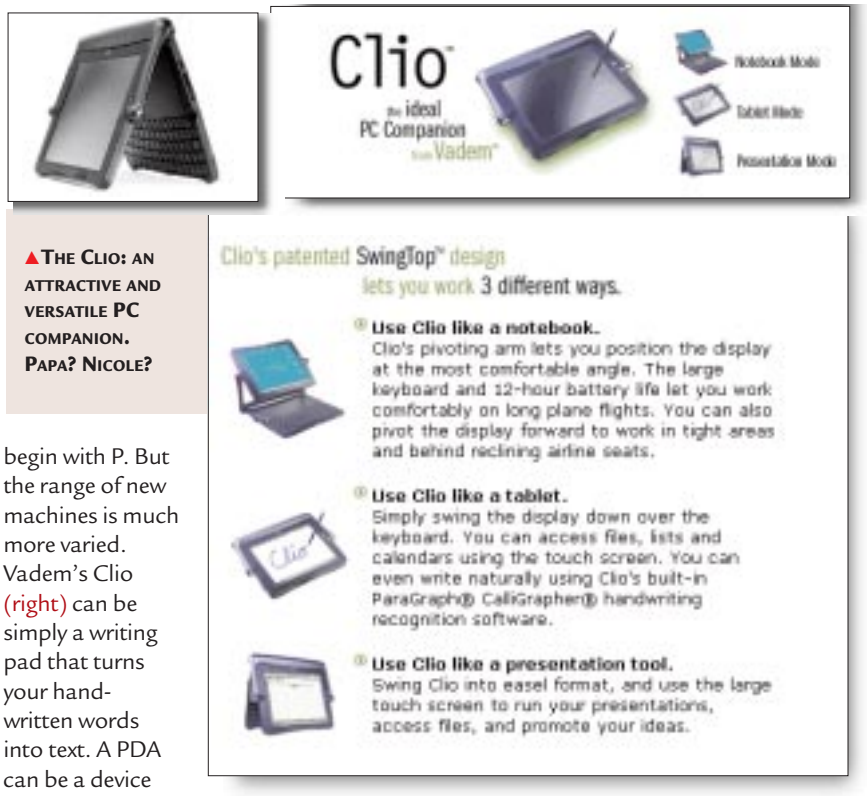
So, what conclusion did I come to about the future of PDAs after overdosing on their conferences?

Before answering, please forgive me for indulging in a brief historical review. Microsoft rose to power by developing an operating system that ran on PCs. PCs are essentially all BBBs (Boring Beige Boxes), so the company that controlled the OS controlled the market. Then Microsoft went on to control the software and on and on. 'Nuff said.

Meanwhile, in the PDA world, there were no BBBs because the technical margins were so much tighter. The challenge of optimising battery life, machine size, machine style, screen readability, software stability, software functionality, memory requirements, etc, defeated some companies completely. Two succeeded brilliantly — Psion and US Robotics (PalmPilot). Both of these firms bit the bullet and developed an OS and a machine that were tightly integrated. Only by doing so could all of the above factors be satisfactorily balanced, each against the others.

So much for history; Moore's law is implacable and the price/power ratio for PDA-type hardware has plummeted. So, crucially as far as Psion is concerned, the need for a tight integration between the OS and the hardware has gone.

Secondly, the diversity of PDAs is undergoing a sea change. PDAs have never fallen into the BBB category in any case – look at the Psion and the Palm; about the only similarity is that both begin with P. But the range of new machines is much more varied. Vadem's Clio (right) can be simply a writing pad that turns your hand-written words into text. A PDA can be a device for watching videos, something you wear on your wrist, it can be something that slots into a pocket of your suit and takes voice input via a tiny microphone and outputs via an earplug — all of these devices do or will soon exist and someone, somewhere will buy them.



▲ **The Clio: an attractive and versatile PC companion. Papa? Nicole?**

So, the situation is that:

- We no longer need to tie the OS to the hardware.
- PDAs are in the process of diverging into manifold forms.

Fine. WinCE can deliver many different machines; in fact, Microsoft doesn't have to do anything, it just delivers the OS and leaves it to the others to come up with the hardware. Psion is promoting new hardware, but Psion is only one company and cannot possibly deliver the diversity of hardware that the market requires.

If I was a PDA developer there is no doubt which platform I would choose

Indeed, given the history, we are moving into major irony territory now. Microsoft continues to be pilloried for trying to control the PC market but, by selling an OS solely for PDAs, it is actively promoting an open PDA market. It is companies like Psion, keen to sell a hardware/software combination, which are in danger of being accused of promoting a closed market.

■ So, who will win?
To summarise:

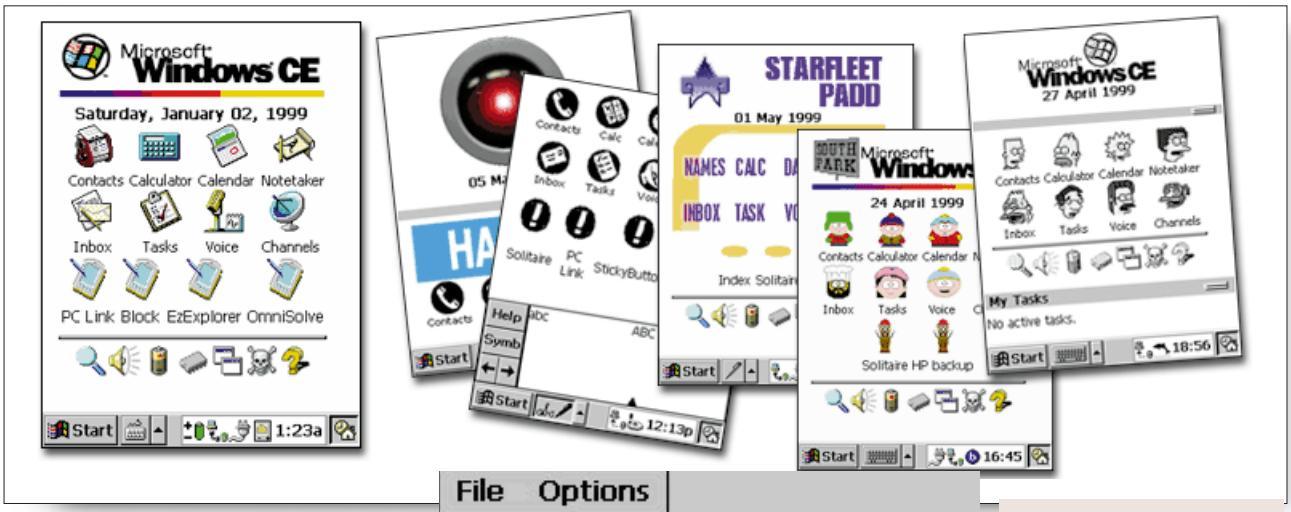
- WinCE has more developers and better development tools.
- The suits are interested enough in WinCE to attend the conferences, so the money is also there to develop applications.
- The hardware manufacturers are flocking to WinCE.
- People who aren't interested in the history of PDAs will buy whichever toy appeals to them from the range presented. There will be more WinCE machines in that range than Symbians.

There is really no contest.

In an attempt to forestall the flood of hate mail from Psion users, let me make it clear what I am not saying:

- That WinCE is technically better than EPOC. I think the reverse is true, but technical excellence is not going to be the deciding factor.
- The Psion PDA line is finished — Psion can continue to produce machines that I hope will sell well. I like the machines that the company produces.
- That might is right.

Also, please note that I have been



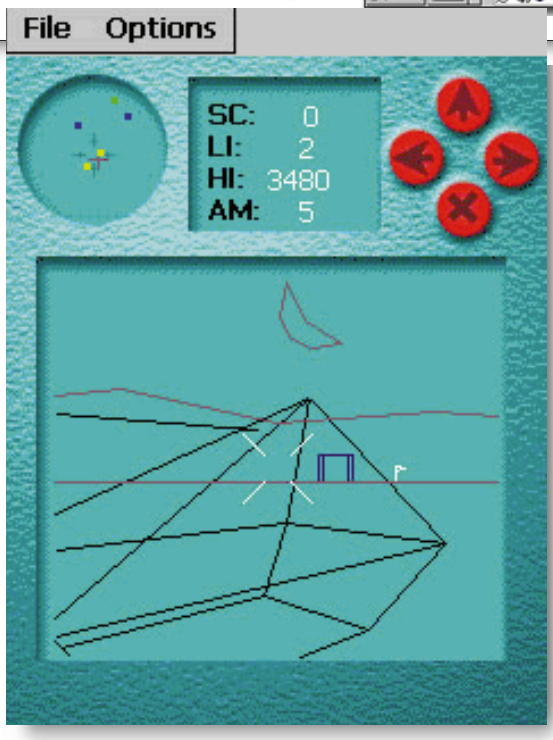
talking about PDAs. Psion is clearly in an impressive position to do great things with phones and that is a whole new ball game. Psion supporters will be delighted to learn that Microsoft only demonstrated one piece of software running on a phone — a 'micro-browser' that could talk to a server and pick up mail. It was dreadful.

What I'm saying is that it is now clear that WinCE will become the dominant OS on PDAs. If this affects your choice of a PDA, then buy one with WinCE.

Toy story

The WinCE show was a techno-toy freak's nightmare — too many goodies. I desperately tried to buy a Vadem Clio while at the show. This is a wonderfully bizarre PDA: as the screen shots on the previous page show, the screen is hinged so that it can be used either as a conventional display device or as a pad upon which you can write. So you can hold the device like a paper pad, write on the screen and the software will turn your words into text. It isn't that word recognition is new, just that the whole bundle works so well as a complete unit. And it was available at just $500. Sadly my attempts to buy one in time to carry it home came to naught, they aren't available in the UK and cannot be shipped. However, I have no doubt that they (or some variation) will appear here soon <www.vadem.com>.

Then there's the Casio E100. I already have one of the first UK spec machines and by the time you read this it should be available to buy. The processor runs at 131MHz, it has 16Mb of RAM, a 240x320 TFT screen providing 65,536 colours. This palm sized device is powerful enough to play video clips complete with stereo sound, and this sort of power also means that there is no longer a need for a tight integration of the OS and the hardware.



▲ Sticky buttons? Beam me up, Kenny

◀ TankZone 3D is Fighting for a good cause

Fun Stuff

John Kennedy <johnk@dircon.co.uk> has been at it again. His TankZone, the 3D shoot-em-up, is now available in colour for the Jornada 420 colour palmsize, as well as the 640x480 screen HPC Pro. (above). TankZone is a charity-ware program so it's fun and you can feel good about playing it.

Kennedy's Pocket Universe has also been updated to Pocket Universe 2000, and has many new features. Once again, support is included for both the colour and the larger screen size of the HPC Pro and the Palm machines.

Even more fun, John has produced Sticky Buttons, a brand new User Interface for WinCE machines. Sticky Buttons adds program launch icons to the Active Desktop of the palmsize PC. So, like a Palm, you can simply tap a large icon to launch the contacts or calculator display.

What's more, anyone can add their own icons to the display: already there are South Park, Star Trek and other free themes to download (Pictured at the top of the page). I've got it running on my Casio and it's fantastic. Especially the HAL version...

Andrew Hirst <ahirst@csi.com> writes: 'I thought you might be interested to know of some developer news for EPOC.

Neuon are developing a number of dialog OPX's to bring the diverse and flexible controls currently only available to C++ developers, within the reach of those who use OPL32. Releases and details are at www.neuon.com.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office, or email pda@pcw.co.uk

Remembrance day

Chris Bidmead finds that Emacs beats the established word processors hands down.

What's the best word processor to run on UNIX? I've tried to persuade you on several occasions to take a radical approach to this question. If you're looking for Microsoft Word, you won't find it — although WordPerfect 8, StarOffice, Applixware, Ted, Maxwell, etc, should provide a lot of what you need. Or at least what you think you need. Me? I use Emacs.

I'm not going to rerun the old arguments here about the benefits of a completely tailorable, totally cross-platform, free, open source text editor that operates primarily in ASCII. But here's a brand new reason. Emacs supports the Remembrance Agent.

The Remembrance Agent is a search and retrieval tool being developed by Bradley Rhodes at the Massachusetts Institute of Technology's Media Lab. The idea is that we all have a mess of information lying around, and some of us (like me) may have been methodical enough to have organised it into a text retrieval database. This enables us to find anything we look for simply by typing in a search phrase — but there's a catch. What if there's a perfectly useful piece of information in there that you don't know about, and so miss looking up? The Remembrance Agent's job is to watch over your shoulder as you write or review documents, and suggest information that might be relevant to the text in front of you. That way it can offer you information you didn't even know enough to ask about.

What if there's a useful piece of information that you don't know about, and so miss looking up?

Rhodes' Remembrance Agent comes as a source tarball (available at rhodes.www .media.mit.edu/people/rhodes/RA) so you'll need to untar this and compile the code on your own machine. If you're running Red Hat Linux or something close there are ready-made i386 binaries for version 5.2 and 6.0.

▲ THIS IS THE REMBEMBRANCE AGENT, WORKING WHILE I WRITE THIS COLUMN. THE DATABASE IN THE LOWER PART OF THE EMACS WINDOW IS DERIVED FROM CORRESPONDENCE WITH READERS. THE BACKGROUND, INCIDENTALLY, IS ONE OF THOSE, ER, RISKY RANDOM IMAGES CONJURED UP BY BLINK

The basic retrieval system can be run from the command prompt, but to get the full benefit you'll need to have a recent version of Emacs or Xemacs on your system. If you do decide to explore this, please write in and let me know how you get on.

Source Code Unifies UNIX

In the commercial world, a lot of effort has gone into developing ways of distributing software that will install on different UNIX versions running on different processors. The one I remember was called ANDF (Architecture Neutral Distribution Format), but not much seems to have happened about this. There's a practical open source compiler at http://alph.dra.hmg.gb/TenDRA, and the GNU people reportedly have an ANDF project on their back burner.

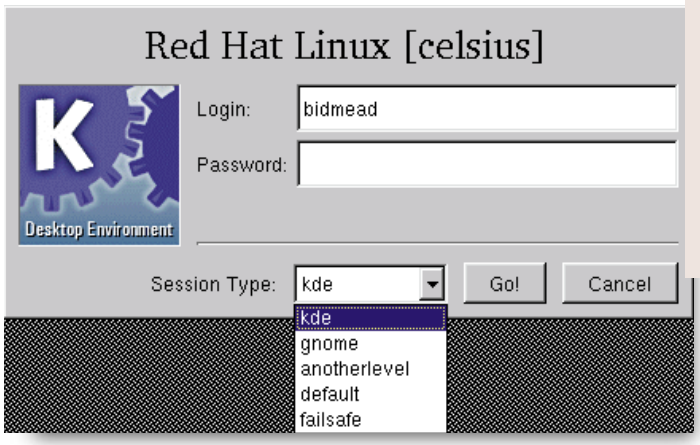
But the point of ANDF is to be able to distribute code in a closed form across multiple platforms. If the code you're distributing is open source, the task is a lot easier. The standard utility that controls how a particular piece of source code is compiled is called 'Make', and you'll find this on every UNIX-like system (except for some dumb commercial UNIXes sold as 'user systems'). Make's behaviour (which compiler it calls, which libraries it uses and so on) is controlled by a config file, usually called 'Makefile'. So, essentially, when compiling the same chunk of source code, the only thing different on my Sun system, my FreeBSD system or my AIX system is the Makefile.

OK, I'm simplifying. For example, there are key differences in some of the internals of the various UNIX-like systems that have to be taken care of by conditional branches in the source code, and this is all extra work for somebody. But if that somebody has done the work right, you as an end-user don't need to know about it. The point I'm getting to is

that source code, combined with a way of setting up the Makefile appropriate to your system, is an entirely viable way of distributing software cross-platform.

So how do you get the right Makefile? If you download the source version of the Remembrance Agent you'll see it comes with a script called 'configure'. You run './configure' and it checks the resources on your system against the requirements of the Remembrance Agent source code and creates the appropriate Makefile. It'll also warn you if any of the necessary components are missing. So I compiled the Remembrance Agent for my system by running './configure' and then 'make'. And then to install the binaries and man pages in their correct directories I ran 'make install' (make and the makefile can control all sorts of operations, not just compiles). So it's not that tough, really.

If you take a look through the configure script you'll get some idea (even if you're not a programmer) of the considerable platform incompatibility problems it is working around. But don't worry too much about Bradley Rhodes and his team getting distracted from the core project having to deal with all these cross-platform niggles, because the creation of the configure script is in turn automated by a utility called 'autoconf' (see http://sourceware.cygnus.com/autoconf for details).



◄ If you've installed Red Hat 6.0 and chosen the option to boot directly into X, this is the login screen you get, offering a choice of desktops. But the display you see here is running on my NeXT machine, which has called it up using the query option to X

Cat and Dog

If you haven't compiled source code before, try your luck with good-dog from http://jl.photodex.com/dog/. It's a simple enough piece of code not to need any of the auto-configure stuff – just compile it on any UNIX-like system that has the GNU gcc compiler.

Dog is a replacement for cat (if you hadn't already guessed), the not very exciting but indispensable utility that squirts files into stdout. Dog is more exciting, although perhaps not entirely meriting the tongue-in-cheek hype accorded it by authors Jason Cohen <dogboy@photodex.com> and Jacob Leverich <leverich@photodex.com>. "Dog 1.3 is riddled with incredible new features," they say. Well... it emulates cat, and supports network sockets, so you can treat an http site as if it were a file and squirt it straight to stdout (which certainly might be handy in a script for collecting URLs from the web, say). More immediately useful is dog's ability to translate between the different line endings used by DOS, the Mac, and UNIX. Oh, and it also supports the k-rad filter 'to convert text to a more readable form' (say the authors). iF you Don't kn0W WHa7 k-R4d is, 7his sHould gIVe y0u 5oM3 ide4.

Blink and you'll miss it

Fancy a utility that downloads JPEGs at random from the web and continually redraws them on the background of your X11 display? Well, yes, you can probably think of a possible snag with that, particularly if you're working in an open office. The author <dave@techweenie.net>, is aware of the problems too, and writes: "Blink may very well display something on your computer that you find offensive. Don't blame me. This is the web, ladies and gentlemen, anything goes. I have tried to filter the images somewhat, but this is by no means foolproof."

If you're drawn to high-risk situations (actually the few times I've run Blink it has only thrown up uncontroversial backgrounds like the one pictured in the screenshot on page 233) you can download it from www.techweenie.net/dave/. It's a perl script and as written it needs the graphics utility xv (but that should be easy enough to change). It's best if you have a permanent internet connection or don't care too much about your phone bill!

Even with all the publicity that Linux gets, it's still worth noting that there are other free UNIXes

Like-minded People

Nick Binns <NickB@mediplus.co.uk> writes: "As Linux is growing all the time, are there any meetings I could attend to find out more. I am still unsure about many of the issues connected with downloading data. I know that I should really do this on the internet, but getting together with like-minded people can be useful."

I suggested Nick visit www.ukuug.org (The UK Unix User Group) – Linux groups in the UK are listed there, as well as more general UNIX groups (which mostly tend to be pretty clued up and sympathetic to Linux anyway).

Linux evangelist and distributor Martin Houston <mhouston@deluxe-tech.co.uk> has sent me details about the Linux '99 Conference, which was held by the UK Unix User Group in June. The aim of the conference is to provide talks, forums and 'clinics' for developers, users and businesses interested in Linux. The 100 or so people who attended may well have expected the usual discussions about Linux maturing from a hobby to a full-scale business proposition, and technical analysis of recent features like symmetrical multiprocessing and support for the new high-performance I2O architecture (from the Linux kernel guru Alan Cox). But there were also less conventional offerings, like John Adams' explanation

of how he uses the ARM port of Linux in the creation of androids.

The XDMCP Adventure, Part II

Last month I began raving about XDMCP and gave you enough details, I hope, to have a crack at getting started with it. You'll need a minimum of two machines, each running an OS that supports X. I've been using a mixture of Xs for this, mostly XFree86 on several different Linux distributions, but including IBM's X implementation for AIX and the Cube'X server available for NeXTSTep.

As I explained last month, the xdm X Display Manager comes as standard with X, so you almost certainly already have it installed, even if you're not running it. To see whether it's running, type something like 'ps ax | grep dm' (the ps flags vary somewhat between UNIX distros) at the command line. That's 'dm' rather than 'xdm' because there are some variants, like gdm and kdm, the Gnome and KDE versions respectively.

If it's not running, just run it. It reads some configuration files (in somewhere like /etc/X11/xdm) on powering up, but in my experience these will already have been correctly set up for general use. The only problem I had was with the gdm supplied with Red Hat 6.0, which I couldn't get to work at all. But xdm and kdm are on the same distribution, and they work fine.

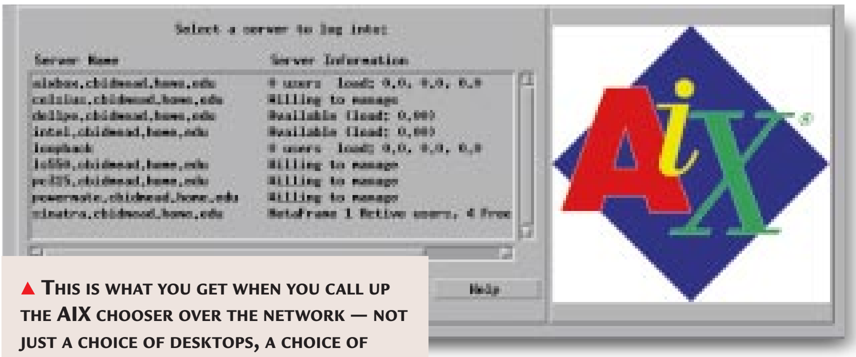
OK, lets say that you now have xdm running on two or more machines on your network. Go to the machine with the best video card and monitor, become root at a virtual terminal and from the command line type:

[redacted]

...where <ot[redacted]achine> is the host name of the remote machine. If the remote machine's xdm is running correctly you should get a login prompt. Respond with your username and password, and lo, you find yourself, as it were, sitting at the other machine.

Did tha[redacted] fail for you with something lik[redacted] Fatal S[redacted]rver E[redacted]r: Serv[redacted] is already activ[redacted] runni[redacted] mac[redacted] ta[redacted] t[redacted]

This invit[redacted]ew X server to come up on the same monitor (typically at VT8 instead of the usual VT7 if you're running Linux). Now you can use whatever local



▲ This is what you get when you call up the AIX chooser over the network — not just a choice of desktops, a choice of logging into any of the machines on the network running xdm or one of its variants. You'll notice that my sinatra server is offering Metaframe, which is the Citrix-flavored version of Microsoft's Windows NT Terminal Server

arrangements there are for switching between X:0 and X:1 (under Linux it'll be something like Ctl-Alt-F7 and Ctl-Alt-F8.

Here's one great use for XDMCP. As I mentioned last month, I have here on loan from Siemens a very powerful dual processor Celsius 2000 technical workstation. Unfortunately its Diamond Fire 4000 Pro video card is not supported by Linux. No matter – I simply run the Celsius via XDMCP from my IBM PC315. And from the same IBM machine I can switch around between the Celsius and any other machine on the network.

Another way to use XDMCP is by way of the intermediate 'chooser' utility that comes as part of xdm. The equivalent on AIX is called dtchooser (under AIX the XDM stuff seems to be all part of CDE in th[redacted]/usr/d[redacted]irect[redacted]y). [redacted]on't have to wor[redacted]ca[redacted]ed, becau[redacted] netw[redacted]ly wh[redacted]n I [redacted]

...from another machine on the network. As you'll have guessed, 'aixbox' is the hostname of my PowerPC-based AIX server. This time instead of putting me onto the AIX desktop, dtchooser powers up, scans the network for listening XDM machines and after a short delay presents me with a list of them to choose from (see the screenshot on this page).

If you have a network, however small, that is running more than one operating system that supports X (and there are X servers for Windows too), do give this XDM stuff a go, if you haven't already. And, as ever, drop me an email to let me know how you get on.

Other free UNIXes

Paul Lee <woodruff@stayfree.co.uk> raises the perennial question: Why Linux?

"Please do not interpret this email as a criticism of your fine column. It isn't. Even considering all the publicity that Linux gets, it's still worth noting that there are other free UNIXes out there, and wondering why Linux is taking off exponentially and they are not. The UNIXes I am on about are the BSD's, Open, Free and Net. Each seems to offer its own specialisation.

Yes, I agree, Paul, and I do get mail about this from time to time, suggesting that I put too much of an emphasis on Linux. I suppose a glib answer would be that Linux is easier to install on a wider range of hardware, and the benefits of the alternatives are too marginal to make an impact.

The 'specialisation' you talk about is a problem for a column like this. The historical reasons for the fragmentation of BSD are fascinating, but obviously don't help ordinary users get a coherent picture of what UNIX is. It's true that there are a variety of Linux distributions, but they'll all fundamentally the same operating system once installed.

My take on this question is that I'm writing the UNIX column, not the Linux or BSD column. Essentially I'm trying to get to the heart of what UNIX is all about, and it seems to make sense to focus on the UNIX that most of my readers seem to be using, if I can do this without getting too bogged down in Linux-specific issues.

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email ***unix@pcw.co.uk***

Theoretically tweaking

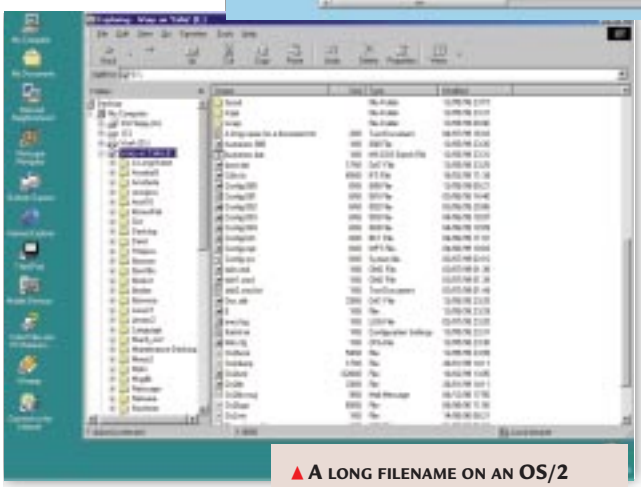
Promises, promises! Terence Green bites off more than he can chew pairing off Windows and OS/2

It was a mistake to make a noise in the last column about shifting back to networking questions after the DOIP months! Not long after that an email from Rupert Russell recalled my earlier promise to write something about the pitfalls of connecting Windows and OS/2 machines. 'Have you ducked out or is this promised article just undergoing a final polish?,' asks Rupert. Ouch!

The truth is, I chickened out. I have a network consisting of several PCs running multiple operating systems – OS/2, Windows and NetWare – and my original plan was to banish IPX and NETBEUI in order to run TCP/IP only. This works perfectly until you want to share drives and printers.

Windows and OS/2 machines require NETBIOS in order to make shared resources visible to each other. If I leave NETBEUI, a specialised workgroup protocol which (as its name implies) supports NETBIOS, on the Microsoft systems and run IBM NETBIOS on the Warp systems, everything works fine. However, dumping NETBEUI is easier said than done.

◀ FILES WITH LONG NAMES CAN BE MOVED BETWEEN SHARED DRIVES IN WINDOWS AND OS/2 WARP 4.0



▲ A LONG FILENAME ON AN OS/2 WARP 4.0 CLIENT VIEWED FROM THE WINDOWS 98 EXPLORER

In theory one simply removes NETBEUI on the Windows PCs and replaces OS/2 NETBIOS on Warp with IBM NETBIOS over TCP/IP. I started working through it, reading relevant messages in the comp.sys.os.os2.* groups on Usenet, and rifling through the IBM technical documents on the Internet.

I really thought I could handle it. But then it all got horribly complicated and I gave up. IBM's installer for NETBIOS over TCP/IP needs to be manually tweaked as it doesn't always edit the INI files correctly and, although the later Windows operating systems (95/98/NT) do NETBIOS over TCP/IP by default, there are differences in the protocol implementations which can lead to frustration.

Admittedly I didn't try very hard before giving up. But the fact that everything works just fine when NETBIOS is installed on both the Windows machines and the Warp systems tempered my desire to get the TCP/IP-only solution working. Eventually I decided that NETBEUI on Windows coupled with Warp's OS/2 NETBIOS works very well and I can heartily recommend it! But, now that Russell has called my bluff I plan to have another go at creating a step-by-step guide.

Russell also says that he has problems using the tape machine on his OS/2 Warp 3 Connect machine to backup Windows 95 machines across the network because Windows appears to truncate long filenames when sending a file to the OS/2 system. He says this happens even though his Windows 95 system can get long filenames from the OS/2 PC. I'm not sure of my facts with respect to Warp 3, but I don't see this problem in a Warp 4/Windows 98 combination.

As you can see from the screen shots I used Windows File Manager to create a file called 'A long name for a document.txt' on a shared Warp drive and copied the file back and forth without seeing any truncation. I suspect the problem on the OS/2 machine might be down to the OS/2 tape backup application rather than Windows. So, if any readers know the answers to any of the above problems, fire away!

■ Free ISPs revisited

The recent columns on connecting to free ISPs generated a large number of responses and questions. I'm sorry I haven't been able to reply to every email but I have tried to put all the information into the column. As ever, it's prepared some months ahead of the publication date, so you might only see a question answered some months after you send it in. Previously we mentioned FreeServe and BT Click in the column but there are now over a dozen free ISPs and it's well worth experimenting.

Several people have recommended alternative free ISPs and a couple have

complained about a slow response on FreeServe. It's possible that FreeServe is slow because of its rapid growth from zero to more than one million users. Certainly I've noticed that the response on my paid ISP (cix.co.uk) is much faster than FreeServe, but then CIX only has a tad over 10,000 users.

Roger Provins says he has successfully signed up with Freedotnet (fdn.co.uk) after using AOL for several years. Roger used the older 16-bit AOL Windows software in a Win-OS/2 session but says now he has moved to OS/2 and Netscape 4.4 on Freedotnet, his download speeds have improved to around 5.2Kbit/sec most of the time.

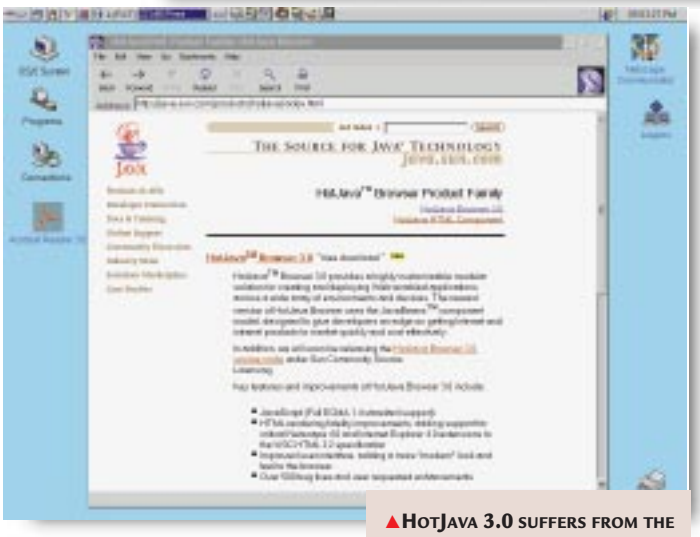
Clive Shearsby suggests Free-Online at www.free-online.net because it claims to support everything from Windows to Linux and mobile phones. Clive also mentioned in passing that he has struck it lucky with Fix Pack 40 (for Warp 3). He runs a Cyrix P166 CPU which reacted poorly to Fix Pack 30. Since upgrading to Fix Pack 40, Clive's system has been fine.

Steve Caine wrote in asking what had happened to the www.internic.com site I mentioned in regard to domain name searches. Well, it seems that in between writing the column and its publication my advice regarding InterNIC was rendered obsolete by events.

The InterNIC site was maintained by Network Solutions Inc. (NSI), which controlled domain name registrations for the .com, .net and .org top-level domains from 1993. This changed recently when a new 'Shared Registration System' was introduced. The new system is being managed by the Internet Corporation for Assigned Names and Numbers (ICANN), a non-profit-making corporation controlled by the Internet community, and they have had a few disagreements with NSI – resulting in some hiccups in the introduction of the new system.

But, you can now go to NSI's new site at www.networksolutions.com to check the availability of .com, .net and .org domains. If you're after UK domains (co.uk, org.uk, net.uk, ltd.uk and plc.uk) try Nominet at www.nominet.org.uk.

◄ **ADOBE ACROBAT READER VERSION 3.0 FOR OS/2 LANGUISHES A LITTLE BEHIND OTHER VERSIONS**



▲ **HOTJAVA 3.0 SUFFERS FROM THE USUAL COMPLAINT FOR JAVA PROGRAMS RUNNING ON OS/2 IN THAT IT IS DISAPPOINTING**

■ Acrobatics

I've had a few requests, in particular from Cecil Wallis and Holger Granholm, to put the OS/2 version of Adobe Acrobat on the cover CD. After earlier problems with applications I decided to stick to putting Fix Packs, Netscape and Java updates on the cover CD, when space allows. But the Adobe Acrobat licence says it may be freely distributed and it's only 4Mb so you should see it on the next CD. As we have come to expect, the OS/2 offering languishes at version 3.0, while the rest of the world can now download 4.0. But if we wanted to run the latest software we wouldn't be using Warp, would we?

While online at Adobe I also grabbed the preview version of the Acrobat Viewer for Java. The documentation says it needs the latest Java version 1.1.8 so I downloaded the 1.1.8 Preview for OS/2 from IBM, only to find that the Adobe installation program is faulty. Apparently it's a known problem.

Flushed with my lack of Java success I downloaded HotJava 3.0 from Sun and tried that on Preview 1.1.8. This is a lightweight browser, also available as a JavaBean component, which installs and runs on OS/2 Java.

Having been very enthusiastic about Java to start with, because it offered the prospect of new applications for OS/2, I've been disappointed by the reality. Java works well inside banks and financial organisations and is widely used on servers. But, it looks like we'll have to wait a while yet for mainstream applications for OS/2 clients, even though every Java benchmark thus far has shown the OS/2 implementation to be a stormer.

Undeterred, we hope to put the released Java 1.1.8 code onto the cover CD. This won't be ready in time for the next issue but we hope to place it on the December cover. We're also waiting for a July refresh of the Netscape 4.4 code and a rumoured 4.5 version for OS/2. We'll put all this on the cover at the earliest opportunity, but don't hold your breath – space on the cover CD for OS/2 material is becoming increasingly less available.

PCW CONTACTS

Terence Green welcomes your feedback on the OS/2 column. Contact him via the PCW editorial office or email os2@pcw.co.uk

Time for embed

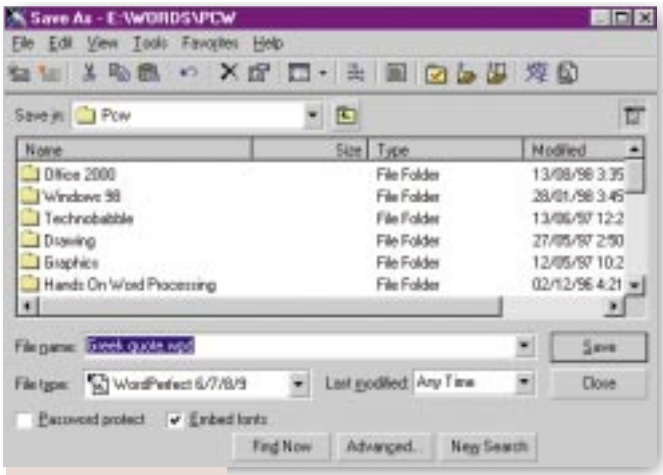
Tim Nott on how to ensure that your nicely formatted documents make sense at the other end.

Last month I mentioned one of the hazards of emailing Word files, in that they might contain information that is apparently deleted, but can be seen when loaded into a text editor. Another common problem with electronically transmitted documents is WYSINWTG — what you see is not what they get. If you email someone a document or send it on disk, they'll only see the fonts that are installed on their own system. So, if you've formatted all your headings in a tasteful Copperplate Gothic and the recipient doesn't have the font installed, then another font will be substituted, ruining your creative efforts. Even worse, if you've used a non-standard symbol or foreign language font, such as the Lotus Maths symbols or WordPerfect Arabic, then if the font isn't installed on the recipient's PC the result will be garbage.

There are several ways around this problem. The easiest is to use the technology known as Portable All-Purpose Electronic Rendering (PAPER). This ensures that fonts and graphics reach the recipient in exactly the same state as they appear when printed from your PC. Although transmission isn't quite as fast as traditional email, the paper product means the recipient doesn't have to be seated at a computer to read them.

A second way is to adopt the technology PCW uses for the Hands On back issues, when they appear on the CD-ROM (for space reasons, not this month). Adobe Acrobat provides a way of viewing pages as the originator intended, regardless of installed fonts or operating system – as long as they have the Acrobat reader. The disadvantage of this method is that usually you need the Acrobat Distiller software to create the Portable Document Format (PDF) files after they've been written in the originating word processor. Version 9 of WordPerfect, however, includes an option to publish straight to PDF.

The third way, should you be unwilling to confine yourself to the standard Windows core fonts, is to use Font Embedding. This, as the name suggests, wraps up a copy of the font file within the document file, so if the former isn't installed at the destination, the characters can still be displayed from the embedded copy.



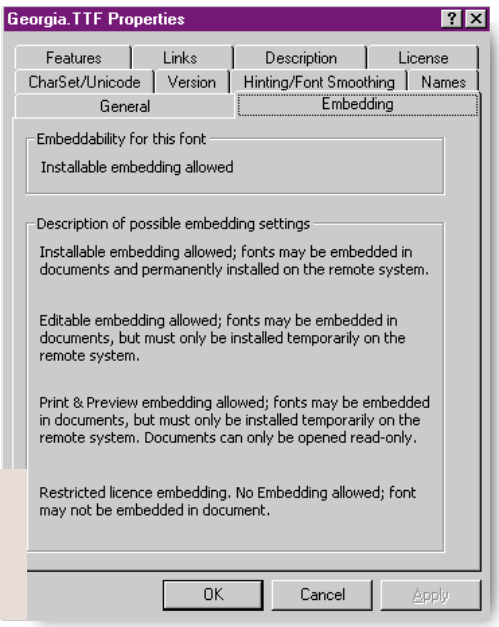
▲ EMBEDDING FONTS IN WORDPERFECT

All the big three word processors support font embedding — though WordPerfect has only just caught up in version 9. In WordPro, this is in Document Properties, Document, Options. In WordPerfect, there's a checkbox in the Save As dialog, and in Word it's in the Tools, Options, Save dialog — where there's also an option to embed just the characters used in the document. This cuts down on the file size but obviously the recipient won't be able to edit the text set in that font.

Word isn't very good at realising that the bold and italic files need embedding

However, embedding has its drawbacks. For a start, it can make substantial differences to file size, especially if several fonts are involved. A further point is that fonts – like other software – are protected by copyright and licence agreements, and it's up to the creator of the font to decide whether to allow embedding.

There are four levels of embedding permission. The most generous – which you'll see in the Windows core fonts and other free fonts that can be downloaded from the Microsoft site mentioned below is 'Installable'. Legally, this means the font can be both embedded in a document and installed on the remote machine. The latter should happen automatically, but I have noticed Word isn't very good at realising that the bold and italic files need embedding as well. My experiments showed that only the



►EVERYTHING YOU WANTED TO KNOW ABOUT FONTS, BUT WERE AFRAID TO ASK

Questions & answers

Q In Word 97 I am able to rotate text in tables using Format, Text Direction. It's very useful for lengthy column headings, for example, where contents of the cells below are short. Is it possible to do a similar trick with WordPerfect, which I now use at work?

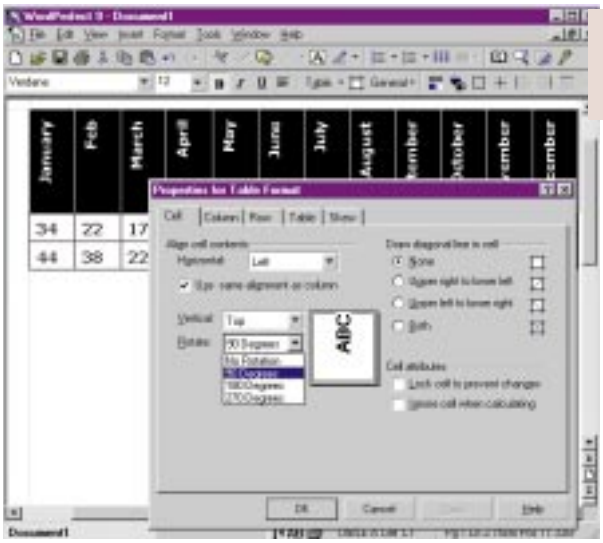
YOLANDE FERRIER

A ***Yes – highlight the cells to rotate, then right-click, Format, Cell. Select the angle from the Rotate list. Note that WordPerfect actually places the text in a frame, which – if you're not careful – can be dragged out of the table. If you want to edit the text, click on it. This will open the text box in a new window, which is a little disconcerting if the document is maximised in WordPerfect, as it appears that the rest of it has disappeared. Make the changes, close the window, and the table will return, reflecting the changes.***

Q I want to produce a set of fifty sequentially-numbered, but otherwise identical certificates in Word. Is this possible?

ALAN DAVIS

A ***The purist's way of doing this would be to write a macro that used a For... Next loop to print a copy, increase the number, print another copy, and so on. Another way would be to do a mail merge, with just the sequential numbers in the data source. An easier way is to use the page numbering feature of Word. Choose Field from the Insert menu, then Page from the Numbering category. If you don't want to start at the number one, then Insert, Page Numbers... and hit the Format button. Enter the 'Start at' number, OK out of the Format dialog, and hit the Close, rather than OK button in the Page Numbers dialog. Put a page break (Control + Enter) at the bottom of the page, then copy and paste to get the required number of pages. Select all the pages and press F9 to update the page number fields. Then print. If the certificates contain graphics, make sure the files are linked to, rather than stored in, the document – this will make a dramatic difference in file size.***



Q If I select all text (Control + A) while I am recording a Word macro, then format the text, I can't cancel the selection by clicking with the mouse until I stop the recorder.

K ROLAND

A ***You'll find that you can't move the cursor with the mouse at all when recording, as neither VBA nor WordBasic support mouse actions of this type. Use the Home, End, Page Up/Down and arrow keys instead.***

Q Back in the days of yore (Windows 3.1 and Word 2.0) I used to be able to display a list of all my Word files, which showed the contents of the documents for each file. Can it be done with Win 98 and Word 7? Also is there any way of deleting a file from inside Word 7?

PETER MOYES

A ***Yes – if you select 'Find file' rather than 'Open' from the File menu you are presented with a dialog which includes an Options button – and one of those options is to preview the file content. The same dialog also has a Delete button.***

◄TURNING THE TABLES IN WORDPERFECT

normal file was embedded and that italicising and emboldening were done by slanting or thickening the normal font, which is a hideous compromise.

The second level is 'Editable'. This means the fonts can't be installed permanently on the recipient machine but the document using them can be edited. Getting more restrictive, 'Print and Preview' embedding lets the recipient see but not touch — much the same as an Acrobat document — and finally 'Restricted Licence' embedding means you can't include the font in a document at all. Just to confuse matters, most of the symbol and special language fonts that come with WordPerfect 9 are in the last category. However, you can embed them in WordPerfect documents — but not elsewhere. Just to add a little more confusion, neither Word nor WordPro seem able to tell you if you're trying to embed a non-embeddable font – the process fails with no warning.

'Restricted Licence' means that you can't embed the font at all

So how can you tell the embedding status of a font? The answer is to download the free Font Properties Extension tool from www.eu.microsoft/typography. As well as addressing this problem it also adds several pages of information to a font's properties, including description, the character sets included, hinting/smoothing and other essential information for font junkies. Since I last mentioned this (July 98) it's been updated, and there is also a good selection of free fonts at the same site.

PCW CONTACTS

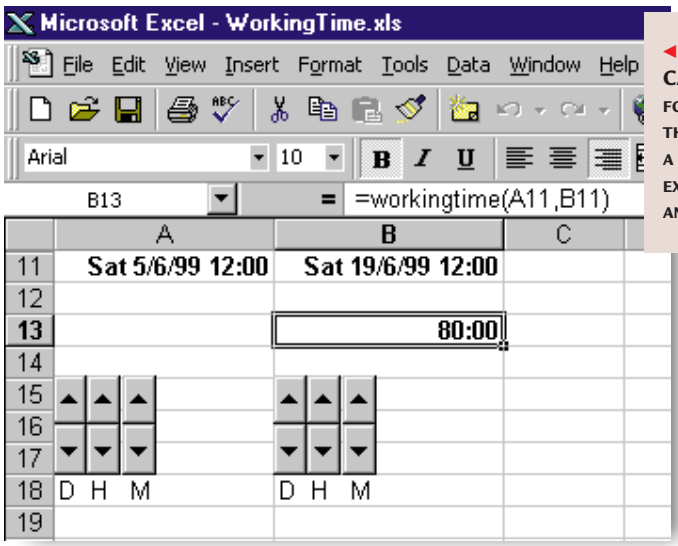
Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk

Counting the days

Steve Wells reveals the hidden day-counting functions to save you from a laborious DIY job

Andy Caddy and Bill Alexander have both sent me listings of functions they have created for counting the number of working days between two dates. Andy's is a very fancy affair (much too long to list here) that expresses the difference in hours and minutes, and even features a worksheet with spinners on it for inputting the start and end dates and times [Fig 1]. His home-grown function, WorkingTime(Start_Time, End_Time), omits Saturdays, Sundays and several Bank Holidays, specified by actual dates listed in the macro for 1999 and 2000, and only counts the hours between 8am and 5pm.

Bill's WorkDays(FromDate, ToDate) function is a much more basic affair, simply counting days between two dates, leaving out the weekends, although the listing is lengthy.



◀FIG 1 ANDY CADDY'S WORKSHEET FOR CALCULATING THE HOURS WORKS IN A CERTAIN PERIOD, EXCLUDING HOLIDAYS AND WEEKENDS

Many readers may not realise that since Version 4, Excel has provided a NETWORKDAYS function. This counts the number of workdays, net of weekends, between two dates. If you can't find it, choose Tools, Add-Ins and see that the Analysis ToolPak Add-In is checked. If the ToolPak isn't listed, go to Control Panel, Add/Remove Programs and load it from your Office or Excel CD-ROM.

Excel will recognise a number of 1-2-3 functions and DATEDIF is one of them

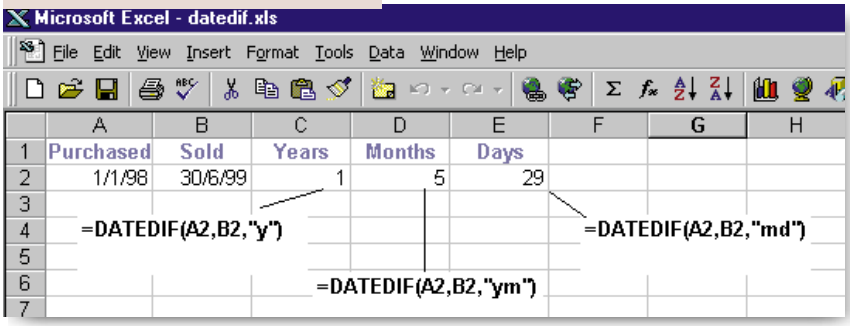
The NETWORKDAYS function takes three arguments: start_date, end_date, and holidays. All three have to be entered as serial date numbers. The easiest way to do this is enter the dates in cells (formatted to display however you like) and then use cell references for the arguments. You could put the start date in A1, the end date in A2, and list the dates of Bank Holidays or other dates to exclude in G1:G12. Then enter =NETWORKDAYS(A1,A2,G1:G12)

If you work a seven-and-a-half-hour day and want to calculate how many hours you worked from Monday August 16th to Friday September 3rd, enter those dates in A1 and A2 and (a Bank Holiday) 30/8/99 in G1. In A3 enter =(NETWORKDAYS(A1,A2,G1)*7.5) You can use the Custom format 0 'hours' and Excel will display 105 hours.

There is another function you can use for date-difference calculations, although it is undocumented in the Excel function listings or Help files. It is the Lotus 1-2-3 function, DATEDIF. There are a number of 1-2-3 functions that Excel will recognise and this is one of them. If the start date of a period is in A1 and the end date is in A2, and you want to count the days, enter =DATEDIF(A1,A2 "d"). To count the years use 'y' and the months use 'm'. To count days ignoring months and years, use 'md'. Count months ignoring years with 'ym.' Count days ignoring years with 'yd.' An example of its use would be in an inventory, [Fig 2]. An item purchased on Jan 1st '98 and sold on June 30th '99 would have been owned for one year, five months, and 29 days.

If you just want to calculate the time of an event like a boat race or a flight, you don't even need a function. Custom format cell A3 h 'hours' mm 'mins' and enter the formula A2-A1. Enter 2/10/99 6 PM in A1 (leave a space before the PM) and enter 3/10/99 9:47 AM in A2. Cell A3 will display 15 hours 47 mins, which is the correct duration.

▼FIG 2 CALCULATING THE DATE DIFFERENTIAL, OR TIME ELAPSED OVER A PERIOD, USING THREE VARIATIONS OF EXCEL'S DATEDIF FUNCTION



Optional printing

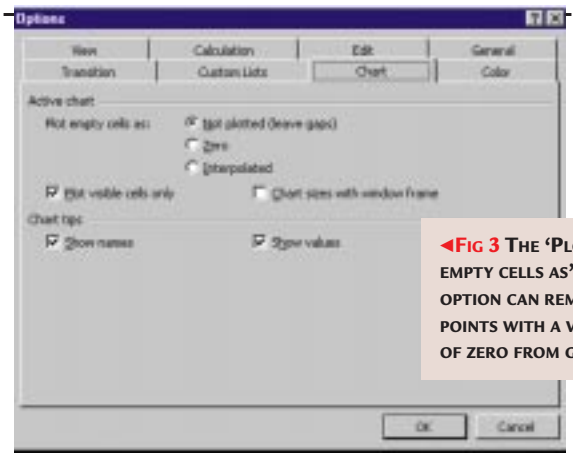
Barry McAleenan and Jim Turner have similar printing problems and if you have an answer I'll pass it on to them. Coincidentally, they both reminisce about the past. Barry uses Lotus 1-2-3

Questions & answers

Q I am employed by a construction company that has a number of remote sites, linked by a WAN. Each of these sites updates a progress report. I then pull together all of the information into an Excel worksheet, from which I draw a progress graph. The problem is if there's no data in a site's file, my report returns a zero that the graph plots. At present I manually add formulas to eliminate these plots but I'm looking for an automatic method, which doesn't involve VBA.

ANDREW KING

a ***With Excel 97, if you click the chart then choose Tools, Options, Chart tab, there is a section headed 'Plot empty cells as' [Fig 3]. Here you can have the zero plots ignored, or drawn, or interpolated – meaning the gaps in lines are joined up.***



◀FIG 3 THE 'PLOT EMPTY CELLS AS' OPTION CAN REMOVE POINTS WITH A VALUE OF ZERO FROM GRAPHS

Q I have a curious problem with Excel 97. At the bottom right hand side of the screen are the letters FIX (on the right of the NUM box) and when I type in figures in a cell, I get a completely different figure from what I've entered. If I type in 6, I get 0.06. How can I get it back to normal?

STEPHEN MOYLE

a ***You need to go to Tools, Options, Edit and uncheck the Fixed decimal box. But it's important to remember that this option is available when you have a lot of cash entries to make. It can save you having to keep putting the decimal point in.***

Q I wish to add a number of months to a date. For example, 6 June 99 + 12 months would return 5 June 00; and 1 October 98 + 5 would return 28 February 99. I must have missed something along the usual routes because I have been forced to produce a formula using conditional statements. Can you point me in the right direction?

MARK OVEREND

a ***If you start with 6 June 99 in A1 (which you produce using the custom format, d mmmm yy) and enter =DATE(YEAR(A1),MONTH(A1)+12,DAY(A1)-1) in a cell you get 5 June 00. Similarly, if you start with 1 October 98 in cell A2, and then enter DATE(YEAR(A2),MONTH(A2)+5,DAY(A2)-1) you can display 28 February 99.***

and says, 'I would like to print a row of cells IF a particular cell in that row has a value of 1 or more. Supposing I have a shopping list of 500 items. I only want to print a list of items I wish to purchase (say 100 rows). Years ago, I could have got a result in BASIC, but software is now too friendly to be truly obliging.'

Jim says, 'An old DOS shareware spreadsheet I use called CALC has a NOPRINT function. A row will not print if a cell in it meets certain conditions. I can't see how to do the same in EXCEL. I can't believe a sophisticated program can be outperformed by software more than 12 years old! I use a spreadsheet for clients' tax calculations. As an example, if a row is for "Interest on Savings" and they do not have any, then I don't want to take up space printing that item.'

Gobbledygook

Andy Williams says: 'I've been trying to access an Excel file from a colleague who has recently left our organisation. I have moved the file and renamed it, then tried to get into it via Access and Word, and also tried to link to it from another spreadsheet but all to no avail. I have managed to open it in Notepad but it is just gobbledygook. Do you have any ideas on how I can get to the data?'

This inaccessibility could be for a wide variety of reasons, but it may well be that the file is corrupted. You could try Excel recovery software such as Concept Data's Excel Recovery program at www.conceptdata.com or a program called ExcelRecovery at www.ExcelRecovery.com.

EXCEL SHORTCUTS

☛When you enter data and press the Tab key, the focus will move to the next cell along the row. But if you move the vertical scroll bar down, so that the first row you wish to make an entry in is at the top of the Window, and click on the column letter, the focus will go down the column. Correspondingly, click the row number, and you can move along the row using Enter.

☛When you drag down the Fill Handle of a cell it copies the contents (or a default series) and the format to the cell below, but if you right-click and then drag you have a number of options, including developing a series of your choice, or changing formatting.

☛If you point to any of the edges of a cell, you can drag the contents to another cell. But if you right-click, point and drag, you are offered a wide range of options.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

◆ *Please do not send attached files unless they have been requested.*

Size matters

Mark Whitehorn finds that keeping PDAs up to date pits memory capacity against download time.

PDAs have tiny brains, at least in database terms. So a significant part of designing a mobile database system is deciding what data will go to which PDA. You have to think about: who needs which data set and which parts of the data should be editable. This is important because some non-editable data may not have to be downloaded to the PDA each time it is synchronised.

These decisions will all require the Wisdom of Solomon and the discernment of... well... the most discerning person you can think of, and you'll notice that I'm not being much help. The answer is that I can't be, and that this is an area where common sense will triumph. You need to balance the desire to shunt lots of data to the PDA with considerations of connect time and speed. You need to talk to the people who will be using the PDAs in the field and find out what they really do with the machines. And they almost certainly won't be able to tell you because they won't have used them in anger yet, so they won't have enough experience. The good news is that this is a major challenge and we thrive on challenges. Incidentally, I stress the 'design' side so much because actually implementing the process of sub-setting the data is trivial – that's what SQL is for.

Another aspect worth considering is that technologies such as the new IBM micro disks are set to revolutionise this process when they come on-stream in the latter part of the year – 340Mb is an order of magnitude improvement for PDAs. In some ways this helps to make the design process easier: as you don't need to spend so much time agonising over which parts of the data are required. On the other hand, sending too much data can be equally problematical because of the time the transmission can take.

The new IBM micro disks are set to revolutionise the design process

Working days

Database people clearly love calculating the number of working days – perhaps it's because we all work so hard; we need to know when we will be free. There has been a flood of mail about this. In particular, Ken Sheridan put a great deal of effort into the topic; amongst other contributions he translated Charli's dBASE code into Access.

[FIG 1]

```
1+DateDiff("d",[Start],[End])-
(DateDiff("ww",[Start]-
1,[End],7)+DateDiff("ww",[Start]-1,[End]))
```

The bottom line is that many people seem to use a simple system – division by seven and multiplication by five. This will often give the correct answer or at least give something close. But for those who need/want/demand an exact answer the problem is more complex. To begin with you need to take account of the start and end days. Secondly there are public holidays such as bank holidays. The second problem is only solvable using a table of dates, but we can address the first more easily.

Charli's code does this rather elegantly and I suggested that as an exercise you could try to figure out how it works. I was going to provide an explanation this month, however, Charli (who's in fact male – sorry about that!) wrote in himself and saved me the trouble. His detailed explanation will apear on a future cover disc.

Andy Robinson <andycrobinson@hotmail.com> sent in an Access specific answer which involves no coding at all – you could; for example, embed the formula in a form, as in Fig 1.

Record Ordering

On a different topic, David Saville extended the Record Ordering problem mentioned in the June issue. He defines another class of problem, together with a solution: 'A more interesting problem is to include record numbering actually within the output from a query, which is a problem I had to solve for one of our customers a while ago.

[FIG 2]

```
SELECT
tblTestContacts.Contact,
tblTestContacts.ContactDate,
basLineCounter([Contact]) AS LineNo
FROM tblTestContacts
ORDER BY tblTestContacts.ContactDate;
```

'The way we solved it was to create an incremental counter function, containing a static variable to prevent the value of the counter from being lost from one invocation to the next, and using this in a query [Fig 2], where the work is actually done by "basLineCounte".'

Stock answer

On the subject of stock levels, the following erudite contribution from Jacques Thoorens <Jacques.Thoorens

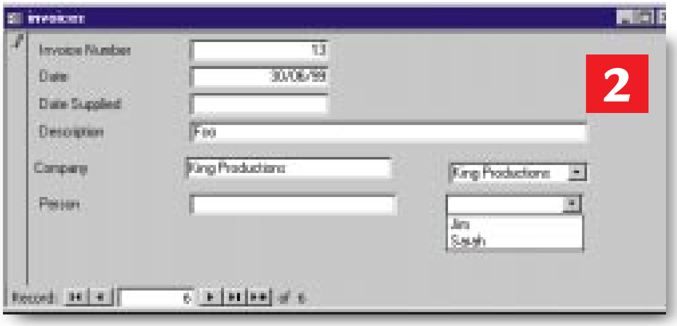
[FIG 3]

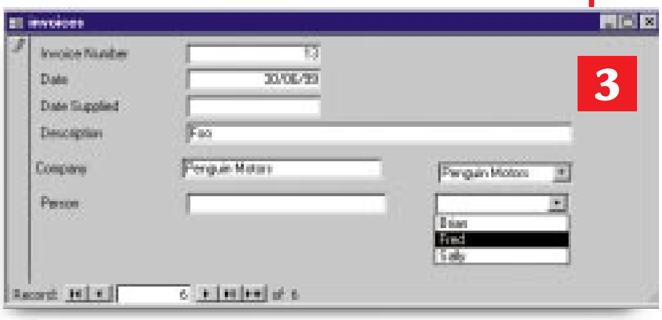
```
SELECT TotalNoItemsSold.ItemNo,
TotalNoItemsSold.Item,
IIf(IsNull([TotalNoOrdered]),0,[TotalNoOrdered]) AS TNO
IIf(IsNull([TotalNoSold]),0,[TotalNoSold]) AS TNS,
[TNO]-[TNS] AS StockLevel
FROM TotalNoItemsSold INNER JOIN TotalNoItemsOrdered
ON TotalNoItemsSold.ItemNo = TotalNoItemsOrdered.ItemNo;
```

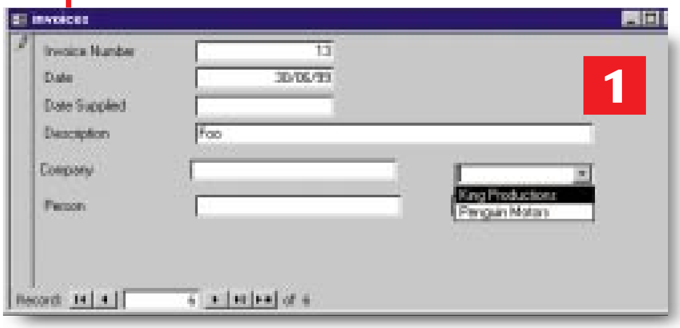
■ Multiple Combo boxes

Tony Kelly wanted to be able to use two combo boxes to subset data. For example, suppose that you have an invoicing system set up and you need to invoice people who work in different companies (screen shot1). On the invoice form itself, you want to be able to choose the company (screen shot 2) and then choose a person. However, the 'person' combo box should only show the names of the people who work for the company you have just chosen (screen shots 3).

Tony supplied an MDB file to do just this, and this will feature on a forthcoming cover disc. Have a play and you should be able to see how it works. The only point that may not be obvious is the On Got Focus property that is set for the second combo box.







Please note this database is simply to demonstrate these multiple combo boxes. It is not supposed to be the epitome of good design in other ways!

@ping.be> is worth reading, not only for information about stock levels, but also for information on differences between Access and SQL server.

'I read your column every month in *Personal Computer World Hands On* and I was very interested by your April paper about stock level.

Thinking about it, I have another solution to propose.

The problem is there is no way to make a calculation with Null. Or to say it another way, each expression containing a Null value is evaluated as Null. Fortunately, Access provides a unique function whose purpose is to avoid this "contamination" : IsNull( ).

Here is a proposal for replacing your StockLevel query : instead of using TotalNoOrdered and TotalNoSold, which can contain Nulls, I use TNO and TNS, two expressions built with IIf( ) and IsNull( ) functions [Fig 3].

Knowing that your column is not about Access but databases, I wondered if this solution could be used on any RDBMS. I tried to apply it to SQL Server 6.5. However, Isnull() behaves differently in SQLServer, so you will have to find another solution.

The method I suggest uses two different ways to avoid Null. The first uses the versatile CASE WHEN THEN ELSE construct and the second one the more compact function ISNULL(). To illustrate both of them, I have mixed them together [Fig 4], where TotalNoItemsSold and TotalNoItemsOrdered are views made in the same fashion as your queries.

[FIG 4]

```
CREATE VIEW StockLevel
AS
SELECT TotalNoItemsSold.ItemNo,
 TotalNoItemsSold.Item,
 TNO = CASE
 WHEN TotalNoOrdered IS NULL THEN 0
 ELSE TotalNoOrdered
 END,
 TNS = CASE
 WHEN TotalNoSold IS NULL THEN 0
 ELSE TotalNoSold
 END,
 ISNULL(TotalNoOrdered,0) — ISNULL(TotalNoSold,0) AS StockLevel
FROM TotalNoItemsSold,TotalNoItemsOrdered
WHERE TotalNoItemsSold.ItemNo = TotalNoItemsOrdered.ItemNo
```

■ Future disc

The full text of the examples from this month's column will be available on a CD-ROM soon.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email database@pcw.co.uk

DVD on your PC

Gordon Laing looks at ways of giving your PC a front row seat in your home cinema

Today's half-decent PCs come fitted with DVD-ROM drives, but are they necessary, and should existing CD-ROM owners upgrade? In the near future we'll have properly authored PC DVD titles, but in the meantime, these drives are being pitched as high-quality movie machines. In this *Hands On* Hardware special, we've taken a close look at the various issues involved in watching DVDs on your PC, and discovered you may want to think carefully before settling down with a box of popcorn.

Two sides to a story

DVD-ROM drives look exactly like CD-ROM drives, and use the same ATAPI EIDE or SCSI interfaces. Once connected, a DVD-ROM drive behaves in the same way as a CD-ROM drive: the OS assigns it a drive letter, and it'll happily read both DVDs and CDs.

The actual drive is only one half of the story. By itself, it may be able to access the data on the discs, but not necessarily know what to do with it. The video on DVD movies is digitised and heavily compressed using the MPEG-2 format, while the audio is encoded using a variety of systems, commonly Dolby Digital and MPEG, and more rarely DTS and Linear PCM. Each one of these audio formats is digitally delivered by DVD and simply needs to be converted into analog for us to hear it. The video too needs to be decompressed and converted into an analog signal for us to see it.

Anyone who wants flawless DVD playback needs a hardware decoder card

Three steps to heaven

There are three ways to decode DVD's video and audio streams on a PC: first by using dedicated hardware muscle, second by using cunning software running on a sufficiently quick CPU, and third by sharing video and audio decoding between both dedicated hardware and cunning software. We'll be looking at how each of these works with their pros and cons.

◀ WITH SETUPS LIKE THE DIGITHEATRE FROM VIDEOLOGIC YOU'LL NEVER HAVE TO ENDURE SCREAMING KIDS AT THE CINEMA AGAIN

Dedicated hardware solution

Using dedicated hardware to process and decode DVD movies was the first, and remains the most superior solution for PCs. VideoLogic's DVD player card costs £65, and Creative Labs' Encore DVD bundles a 6X DVD-ROM drive and card for £138. A bundle is the best choice for those wanting to watch movies on their PC but currently without any DVD equipment of any description.

The suppliers of DVD decoder cards surprisingly play their benefits down, describing them as ideal for anyone wanting to watch movies on slower PCs which can't take the strain of software decoding; typically they'll work on a P133 upwards. Many cards are also sold to owners of fast PCs which came supplied with a DVD-ROM drive, but found the bundled software decoding disappointing.

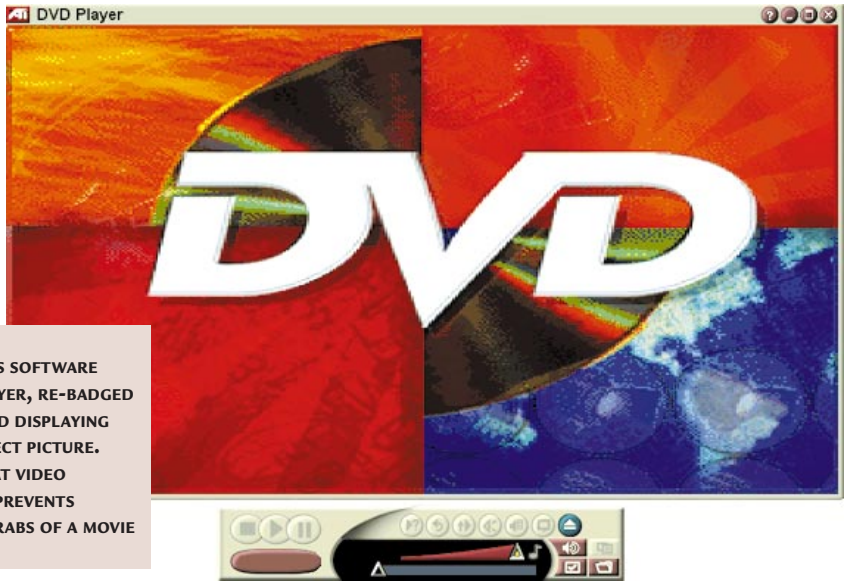
These cards also tend to feature TV outputs, which deliver the pure decoded PAL or NTSC video signals in a composite or, preferably, S-Video format. These outputs usually don't render your Windows desktop, making them no good for playing games or browsing the web on your telly. However, by delivering plain video only, the quality is a lot higher than simply displaying video in a desktop window, even when using the full PC screen.

Decoder cards also win on the audio front. Most feature an SPDIF (Sony/Philips Digital InterFace) socket that delivers the raw digital audio signal to an external surround sound processor. This signal could contain linear stereo PCM (such as CD audio), or compressed multi-channel digital surround sound. The mandatory standard for audio on DVD movies is Dolby Digital, encoded in two or six separate channels, and compressed using the AC3 algorithm.

Two-channel audio can contain hidden matrixed surround information. It'll sound fine played back through two speakers, but a Dolby ProLogic processor will extract two additional signals for a centre speaker and pair of

rear surround speakers. Hence basic analog surround sound.

Six-channel surround sound is commonly referred to as 5.1 audio. This refers to five separate full range channels for the three front and two rear speakers, along with a dedicated subwoofer deep bass channel, known as point-one. Most DVD titles take the original uncompressed 5.1 soundtrack, digitise (if necessary), and then compress it. Dolby Digital squeezes 5.1 channels into a bitstream of between 384 and 448 kb/sec, while higher quality systems such as DTS don't compress as heavily, but require something around 1.4Mb/sec for 5.1 audio.



▶ZORAN'S SOFTWARE DVD PLAYER, RE-BADGED BY ATI AND DISPLAYING 16:9 ASPECT PICTURE. NOTE THAT VIDEO OVERLAY PREVENTS SCREEN GRABS OF A MOVIE

A dedicated PC DVD decoder card will take the Dolby Digital signal, and mix it down into two-channel stereo (whether originally 2.0 or 5.1 channels), then deliver this as an analog stereo output; normally this will be fed to your speakers via your soundcard. The SPDIF output, however, provides external access to the original digital audio signal, which then can be fed to a separate Dolby Digital decoder. VideoLogic's DigiTheatre (£250) and Creative Labs Desktop Theatre 5.1 (£139) are 5.1 channel speaker systems, with amps and Dolby Digital decoders for a simple home-cinema audio setup. No PC solutions currently handle DTS soundtracks, unfortunately, but then the existing titles are rare and sold in the States only.

So far, so good, but in order to display DVD video on your PC monitor, decoder cards often employ VGA pass-through cables in the same way as Voodoo2 3D accelerator cards. Whatever the manufacturers say, pass-throughs degrade the quality of your standard windows desktop image, particularly at high resolutions. If your monitor has two inputs, you could connect the decoder to one and the video card to the other, sacrificing video overlay but retaining a good looking desktop. Some decoder cards won't operate properly, or calibrate themselves when disconnected from the main video card, but it's worth experimenting.

Software solution

Technology enthusiasts love software solutions. Why bother with expensive, power-consuming hardware when the same effect can be emulated using software running on a sufficiently-fast main CPU?

First of all, 'sufficiently-fast CPU' means a Pentium II running at 350MHz at least. In fact in tests we experienced dropped frames and out-of-sync audio on processors up to PIII 550s. Such glitches admittedly rarely occur, but the human eye and brain spot them immediately, ruining the effect of the film for discerning viewers. Try running Windows system monitor to see the effect of software decoding. Even our PIII 550 totally maxed out at 100 per cent, leaving nothing behind. You'll also curse every time your hard disk performs routine maintenance, jerking the playback. Do make sure you've quit any background processes such as virus checking, though.

Speed aside, there are other issues. Eliminate a decoder card and you, er, eliminate the plugs it supplied. There may be video on your PC monitor, but without a suitable socket, how are you going to get it to your TV? We tried the TV-out sockets on modern video cards, but by delivering the entire Windows desktop, even full-screen DVD playback looked washed out and poor compared to the dedicated video outputs of decoder cards.

Audio-wise it's also all going through your soundcard. Sadly, none of the software decoders we tried would re-route the raw Dolby Digital signal to soundcards with built-in SPDIF outputs. The software took the Dolby signal and downmixed it to two-channel analog stereo, whether you liked it or not. The best you can do with this is run it

SCALING TO FIT YOUR SCREEN

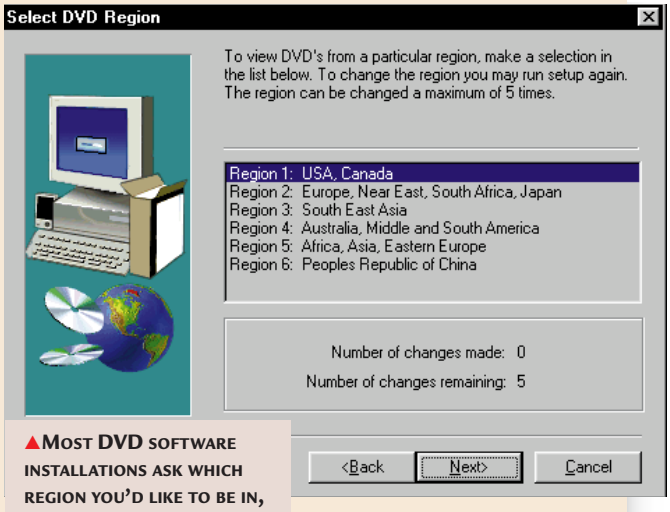
When watching a movie on your monitor, you want it displayed full screen. The problem is that DVD video only measures 640x480 pixels and most PC displays run at higher resolutions.
Games get around this by switching the desktop resolution on the fly, but all PC DVD players we've seen actually put in the effort of scaling and interpolating the image to fit the screen. This process again can prove quite intensive on your processor, so users of software-based decoders may want to manually switch their desktop resolution to 640x480 to give it the easiest job. Then again DVD video interpolated to 1024x768 or higher still can look pretty smooth. In effect your PC is acting as a budget line doubler and de-interlacer, both pieces of equipment that cost a fortune for domestic home theatres.

REGIONAL CODING

In an attempt to control worldwide releases, Hollywood divided the globe into six regions for DVD movies. Region 1 is North America, Region 2 is Europe and Japan, and so on. The theory is that players from one region will only playback titles from its home region, and reject foreign material. However, the slow take-up of DVD outside the US has driven tweakers to adjust players to allow them to access titles from all over the world. This involves soldering a new chip into a domestic player; however, there are regional hacks for PC playback.

All the DVD transport utilities we've installed ask upon installation which region you are in; in effect they're asking which region you'd like to be in, and will happily accept the Region 1 option, allowing playback of imported North American titles. However, the utilities usually only let you change the region when reinstalling the software, and most restrict the number of changes to five.

We found that setting up two otherwise identical Windows Hardware profiles from the System properties Control Panel could solve the problem. Simply install the utility as, say, Region 1 for the first profile, then restart Windows, choose the other profile, and install Region 2 drivers. In almost all cases you'll now be able to playback titles from wherever you want by changing Windows profiles. Bear in mind that there's talk of fitting hardware restrictions to DVD-ROM drives, but in our experience, there's no player – domestic, software or on a card – that can't be regionally modified.



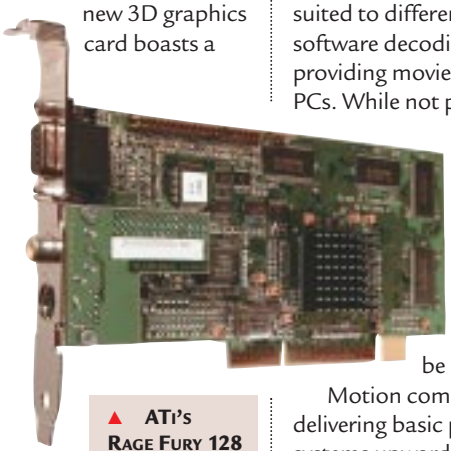
▲ MOST DVD SOFTWARE INSTALLATIONS ASK WHICH REGION YOU'D LIKE TO BE IN, BUT ONLY LET YOU CHANGE IT FIVE TIMES. USING WINDOWS HARDWARE PROFILES YOU CAN INSTALL MULTIPLE REGIONS

through a Dolby ProLogic surround processor. In this instance you should choose two-channel Dolby stereo over Dolby Digital 5.1 when playing back DVDs, as it required slightly less processing muscle for the final downmix. With any luck, future soundcard drivers and software players will be able to use existing SPDIF outputs for all types of audio streams.

☞ Mix 'n match

You can't help noticing that almost every new 3D graphics card boasts a DVD feature known as motion compensation. This actually takes care of decoding and processing the complex video signal, leaving the relatively simple audio decoding to your main CPU.

In our tests the main processor hit was typically reduced to around five to ten percent when using an ATi Rage Fury 128 card for DVD playback. Better still was that for display on your monitor, there were no nasty pass-through cables. However despite allowing you to play games on your TV, the PAL/NTSC video outputs remained inferior to those from dedicated cards, and once again the audio was software-downmixed analog stereo.



▲ ATI'S RAGE FURY 128 DID WELL, BUT DEDICATION'S WHAT YOU NEED

■ Conclusions

These three PC decoding solutions are suited to different environments. Pure software decoding is a very cheap way of providing movie playback on fast new PCs. While not perfect in many respects, it allows users to cheaply evaluate the format for a more serious purchase in the future. Also as CPUs get faster and hardware drivers more cunning, most of the issues will be resolved.

Motion compensation is great for delivering basic playback on mid-range systems upwards, and anyone considering a new graphics card should definitely make sure it has this handy facility. Like software decoding, however, it's only currently suitable for toying with movie playback on your PC monitor.

Anyone who wants flawless DVD playback using a PC still needs a hardware decoder card. They supply the best signal to a TV and most offer SPDIF output, providing access to the Dolby Digital 5.1 soundtrack. Do bear in mind the pass-through cables, however.

So saying, if you want to connect it to your TV, you'll need your PC in the same room, or a very long cable. If it's in your lounge you'll have to put up with its noise let alone the looks, while if it's in another room, then how are you going to control it? Additionally, who wants to wait for a PC to start up to watch a film in the first place? It might be possible to playback DVD movies on your PC, but if you're really serious about home cinema, buy a domestic player – a regionally modified Pioneer 717 or Sony 7700 are our recommendations.

PCW CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office, or email hardware@pcw.co.uk

Big audio dynamite

Stephen Helstrip gives you the low-down on MP3 – the CD-quality audio format that has the music industry in a flap

A column devoted to MP3s is long overdue, so this month we'll be looking at the technology behind them and the software you need to create and play them on your PC. Although there has been some controversy surrounding the format – particularly in the music industry where copyright issues are a major concern – we won't be getting into any of that.

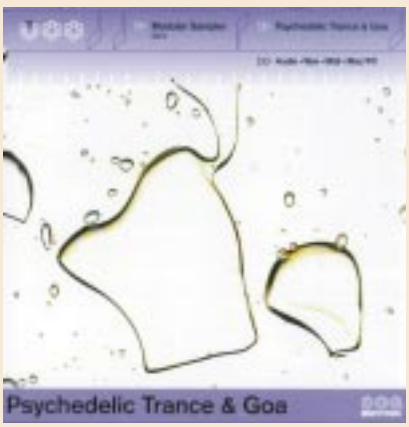
▶ **Fig 1** MusicMatch Juke Box has everything you need to encode and play MP3s

So what are MP3s? MP3 is an abbreviation for MPEG-1 Layer 3 and is a standard for compressing and storing audio at ratios as high as 96:1. MPEG was developed as a compression tool for

Fig 2: Table of MP3 compression ratios

Reduction Ratio	96:1	48:1	24:1	26-24:1	16:1	14-12:1
Sound Quality	Telephone	Better than Short-wave radio	Better than AM radio	FM Radio	Near CD	CD
Bandwidth	2.5KHz	4.5KHz	7.5KHz	11KHz	15KHz	>15KHz
Mono / Stereo	Mono	Mono	Mono	Stereo	Stereo	Stereo
Bitrate	8Kb/sec	16Kb/sec	32Kb/sec	56-64Kb/sec	96Kb/sec	112-128Kb/sec

Beatnik Psychedelic Trance and Goa



If there's one genre of dance music that has taken off in a big way this year then it has to be trance. Judge Jules, Pete Tong, Dave Pierce – they're all at it. But where do you get all those sounds that make trance what it is? Unless you're prepared to spend upwards of ten grand for a truckload of synthesisers and effects processors, sampling CDs are your best bet.

Psychedelic Trance and Goa is the first in a series of modular discs from Beatnik. Its modular aspect means that all loops (drum, percussion, bass and synth lines) come with the original MIDI files and their constituent parts. So not only can you see how the loops are put together (which is one of the best ways to learn how to do it yourself), you can swap one sound for another within a loop, change its tempo or just use the samples to create something new.

Each title comes with two discs: an audio version, and a CD-ROM containing the sounds in .wav format and the said MIDI files. The first six tracks provide samples in a construction kit format to enable you to get a track up and running. The production is first class. The remainder of the disc is crammed with loops, single-shot drum sounds, multi-sampled basses, synths, pads and analog effects. Again, the production is excellent and there's plenty of variation to inspire. At a shade under £40 they're excellent value as well.

Each disk costs £39.95 (£34 ex VAT) from SampleZone 0800 731 2939

Questions & answers

Q I want to record some tracks to CD-R but I'm having a bit of trouble. I've connected my MiniDisc to my PC via the line input on the sound card and can hear music in stereo through the speakers.

However, I don't seem to be able to record it to the hard drive. I've tried running Sound Recorder while the music is coming through, but it just doesn't pick it up. Can you tell me what I am doing wrong?

PAUL EALEY

***A** From what you've described it sounds as though Windows is setup to record from a device other than your sound card. Have you got a voice modem installed? To sort this out you need to run the Multimedia applet from the Control Panel and select your sound card as the preferred recording device. That should do the trick.*

Q I have a case of Atari-formatted discs filled with Cubase song files and would like to use them on my PC. When I try to load a file, Windows reports that the disc in drive A is not formatted. I've heard it is possible to load the discs, do you know how?

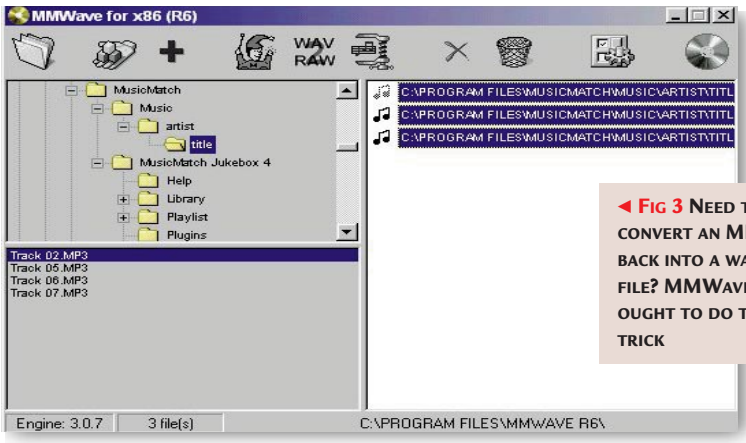
NEIL CHIPCHASE

***A** There is a way round this but you will need to dig out your old Atari. As you point out, PCs wont accept Atari discs. However, an Atari will read a PC-formatted disc providing it's one of those double density ones (720Kb). All you need to do is save your songs on to one of these and you're flying.*

Q I'm quite keen to use my PC for making music but being a complete novice I'm not sure where to start. I already have a MIDI keyboard (a Roland D-50) and fancy a go at sequencing and maybe trying out some of those plug-ins you're always talking about. Can you recommend a good book to get me started?

SIMON WEST

***A** The best book I've seen is PC Music the Easy Guide. It's perfect for someone like yourself and covers everything you're likely to want to know. As well as chapters dedicated to sequencing and direct to disc recording, there's info on sound cards, software synthesis, wave editing and those plug-ins. It costs £9.95 from PC Publishing.*



◀ FIG 3 NEED TO CONVERT AN MP3 BACK INTO A WAVE FILE? MMWAVE OUGHT TO DO THE TRICK

video and audio. Recently, though, it has become associated mainly with the latter and has been accepted as the de-facto audio format for internet users.

MP3 has benefits for the PC musician as well, and has become the standard for a good reason – it requires less space than other compression techniques and sounds much better. For example, you can fit up to a minute of CD-quality (44.1 kHz, 16-bit stereo) audio in just 1Mb. By comparison, you would need around 10Mb for the equivalent .wav file.

How does it all work, then? When we listen to music there are many elements of sound which our ears don't detect, for example, when one sound is masked by another. Using a mathematical model of the human ear, MP3 encoders (aka rippers) are able to sift out these redundant frequencies. So, we end up with much smaller file sizes, yet the perceived output remains more or less the same as the original recording. An MP3 player (or decoder) is much less complex as it isn't required to apply a psycho-acoustic modal – it just plays back what's there.

To create your own MP3s you will need an encoder. There are a few good ones available on the internet for free, although some do require a registration fee. For playback you'll need a decoder. One of the most popular ones is Win Amp because it can handle RealAudio, mod and MIDI files together. Both programs can be downloaded from www.maz-sound.com.

Perhaps the most useful MP3 utility I've come across to date is MusicMatch Juke Box [Fig 1]. As well as encoding and decoding, it is able to rip audio tracks straight from a CD and compile play lists. It can also encode from an audio source connected to your sound card's line input.

A dedicated webpage provides graphics, lyrics and track contents for a growing number of albums, but perhaps best of all, it's easy to use, quick, free and fully functional. The only limitation is that you cannot encode in full CD quality, only near CD quality. Registering will unlock this feature, though. To get yourself a copy, point your browser to www.musicmatch.com

At some point you may find you need to convert an MP3 back into a wave file. One rather neat utility for doing this is MMWave [Fig 3]. It's available from www.xs4all.dk and is completely free.

MP3s can be encoded with varying degrees of sound quality. Fig 2 shows a table of compression ratios which should give you some idea of the bit-rates that are required for the six most common formats.

PCW CONTACTS

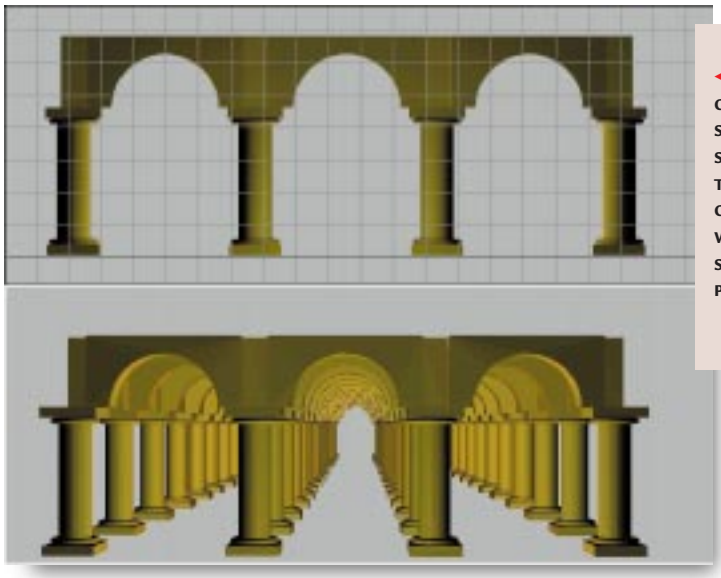
Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk

Show business

Benjamin Woolley on how cinematography is pushing 3D animation into the realms of Hollywood.

Creating 3D animations is often compared to making movies and this is a fair, as well as gratifyingly glamorous, analogy. It also explains why 3D graphics production is such hard work, as the artist effectively has to act as combined director, scriptwriter, set designer, set builder, props buyer and casting director. And there is another role, one universally recognised in Hollywood as key to the success of a production, but curiously neglected in the world of 3D: cinematography.

Cinematography is hugely important in 3D graphics because one of the most powerful tools that you have for viewing and rendering the scene you have created is a camera.



◀Fig 1 Two views of the same object seen from the same position. The top shows the orthogonal view, while the bottom shows the perspective view

Many 3D artists build and render their scenes using 'perspective' or even just 'orthogonal' viewports. Orthogonal views are the computer equivalent of the 'plan and elevation' drawings produced by an architect. They are abstractions, and it is not possible to really look at an object 'orthogonally'. Perspective views, on the other hand, simulate what the eye would see if the objects were real [Fig 1].

The reason why orthogonal viewports are useful is that they reveal an object's true geometry, so they are ideal for modelling. Fig 2 shows the same model shown through different viewports. The 'real' shape is in Fig 2a, in which the object can be seen from the top in an orthogonal viewport. Fig 2b shows the same object at an angle of 45 degrees to the horizontal, in a perspective viewport.

Fig 2c, the most distorted of all, isn't a perspective view, but one produced by using a virtual camera – the distortion has been created by exploiting the camera's capabilities.

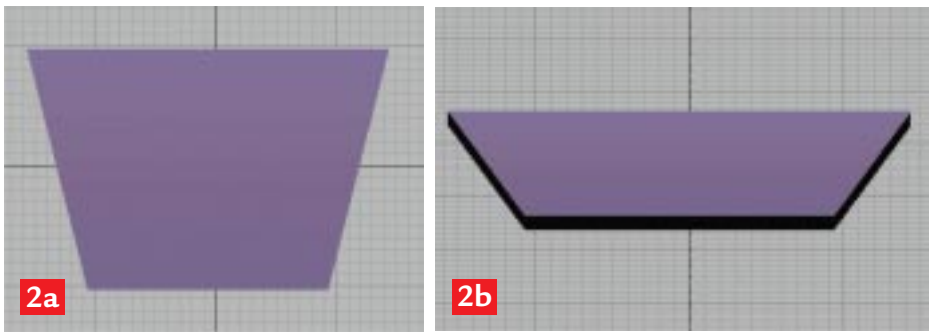
In the world of 3D graphics, cameras are odd entities. They are objects that you place within a scene and can move around like any other, but with a number of distinctive qualities. Like real cameras, they have lenses, and they can zoom. But they do not have tripods or viewfinders. Instead you can put them just about anywhere you want, and view what they 'see' through a viewport. Their position in the scene is represented by an icon or gizmo. You can have as many as you want, and none of them will be visible in the final render. The camera gizmo usually has another object attached to it, a 'target'. By moving this around, you can alter the camera's orientation. If you place a target inside another object, that object will appear to be in the middle of the scene from that camera's point of view.

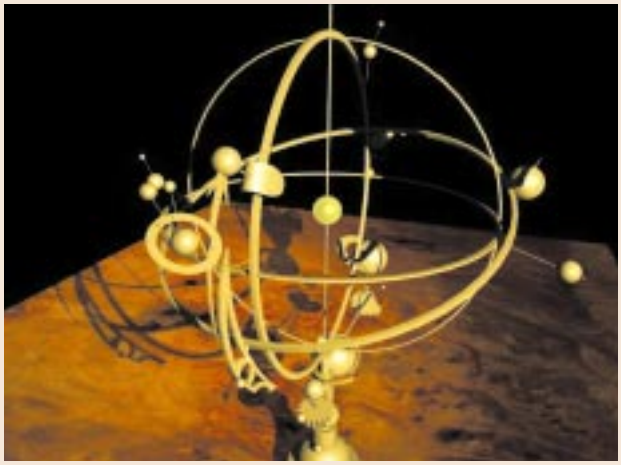
In some 3D packages, you can move the camera around from within the camera viewport. For example, you can 'dolly' (move away from or towards the camera's target), track from side to side, pan (look from left to right or vice versa without moving the camera itself, like swivelling the camera on a tripod) and roll. This is extremely useful for tweaking camera positions.

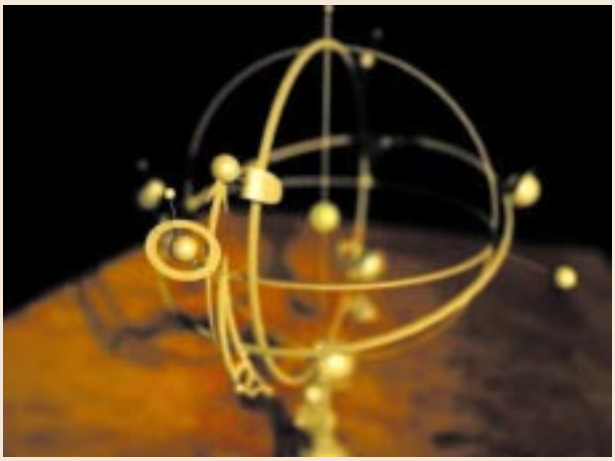
Of course, you can achieve some of these results using a perspective viewport. But a camera has another feature: a lens – or, more accurately, an adjustable focal length. This allows you to play with the perspective, and achieve the sort of result seen in Fig 2c.

Focal length determines the camera's field of view. A short focal length (say 15mm) produces a wide field of view

▼Fig 2 Three views of the same object. The first is orthogonal, revealing its true shape [2a]; the second is through a perspective viewport [2b], the third is through a camera [2c]







Virtual cameras have one fundamentally different quality to their optical equivalents: they have infinite focus whatever the focal length, lighting conditions and depth of field. Everything is always pin-sharp. This makes the virtual camera capable of feats impossible to reproduce using a physical camera.

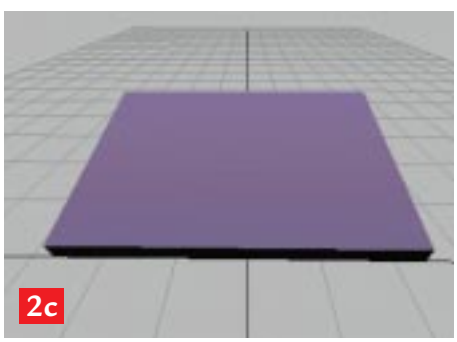
For an animation I made a few years ago for the BBC's *The Net*, I had the camera move from a room interior, out of a window, over some trees, up into the sky (illuminated by a firework display), through the atmosphere and deep into space – all in a single 'take'. This would have been optically as well as physically impossible if attempted 'for real', because no single lens would be capable of dealing with such a variety of focal lengths, exposures and focus-pulls.

Such freedoms are, of course, liberating, but they can be a liability too. They can produce artificial-looking results. We are all unconsciously aware of many of the limitations of the camera lens, because we see so much of the world through one. The pin-sharp focus you get in 3D graphics is particularly noticeable, and deprives the artist of one of the cinematographer's most useful tools. By manipulating the focus in a cinematic scene, you can manipulate the audience's focus of attention. You can also provide useful depth-of-field cues, showing the distance of one object from another by having one in focus and the other blurred.

As far as I know, no package yet includes focus as a parameter for a virtual camera. There are, however, plug-ins now becoming available that can be used to simulate focal effects. I've just been trying Defocus Dei, which is bundled with TGS's 3D modelling program Amapi 3D and can also act as a plug-in for SoftImage, Lightwave and 3D Studio MAX (A demo can be downloaded at www.blackfeet.com).

Defocus Dei works by generating a special file for each frame of an animation that contains depth (or 'Z-buffer') information. In post-production, this file can be used to determine which part of the scene is in focus, the depth of the region in focus, and the degree of blur for those regions that are out of focus. Because it uses the Z-buffer information in the Defocus Dei depth file, the result is a proper 3D effect. In other words, it determines which objects in the scene will be in focus according to their distance from the camera as set up in the original 3D model. The results, as you can see from the images above, add a dramatic hint of realism.

(like a wide-angle lens); a long focal length produces a narrow field of view (like a telephoto). The standard focal length of most real cameras is 35mm, and when you set up a virtual camera within a scene, this is usually set as the default. However, in the virtual environment of a 3D scene, you can have lenses of just about any focal length you want, including several that would be unfeasible in the real world.


2c

With normal cameras, the decision about the sort of lens to use will often be restricted to where you can physically place the camera. This means that short (ie wide-angle) lenses have to be used in tight interiors simply to get as much in as possible, while long (ie telephoto) lenses are necessary in wide open spaces where you want to film something distant and inaccessible. With a virtual camera, which can be placed just about anywhere, the choice of lens has much more to do with depth of field. If you use a short lens, depth of field increases. In other words, the distance between the objects in the scene appears greater. This means if you want to emphasise the distance between the foreground and the background in a scene, and provide a sense of space, you should use a shorter lens. If you want to give the impression of everything being close together, you use a longer lens.

Next month I will look at how you can manipulate this depth of field to produce more dramatic effects, and also look at another important feature of the camera: the ability to animate it.

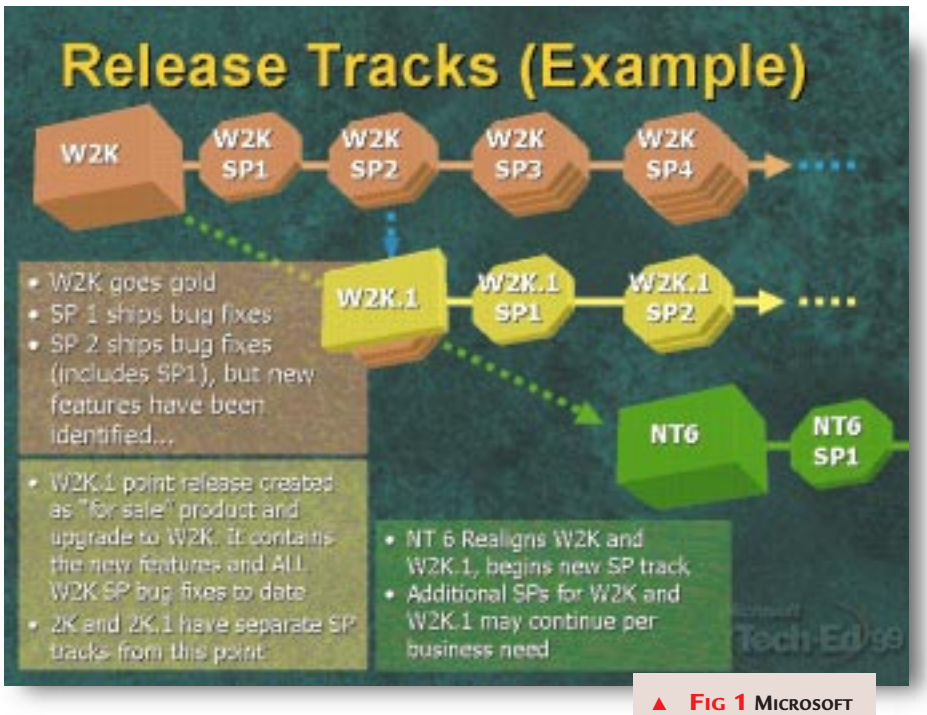
PCW CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office, or email 3d@pcw.co.uk

Arrested development?

Are you ready for Windows 2000? Tim Anderson looks at what it means for developers

Windows 2000 is coming – in fact there is every indication it will be released before the end of 1999. Developers are wondering if their applications will still run, and whether the new Windows will be more reliable than the old. At Tech-Ed, Microsoft's annual European technical conference in Amsterdam, I took the opportunity to quiz those who should know what Windows 2000 will mean for developers. Here are a few key points.



▲ **Fig 1** Microsoft is proposing a two-track service pack scenario for Windows 2000

Will applications still run?

Most applications that run on Windows NT 4.0 will run on Windows 2000. The main problem area is installation. The major version number has changed to 5.0, which can trip up some installers.

Because it is the install that is most likely to fail, some applications will migrate smoothly if the system is upgraded to Windows 2000, but will not install otherwise. Another potential problem is that Windows 2000 has a new memory manager. Microsoft says this may expose bugs in your application that previously went unnoticed.

It does not end there. Windows 2000 has changes to the NTFS file system, changes to the API, and changes to the way networking is implemented. A Windows 2000 network may not have NetBIOS, the basic Microsoft network API, installed at all; it can all be done through the new Active Directory and internet-style DNS (Domain Naming System). Put another way, this is a different operating system so nothing can be taken for granted.

What about new features?

Having your application run is only half the story. Windows 2000 has new features, and applications which do not support them will not be popular with some users.

For example, multiple-monitor support means handling negative screen co-ordinates correctly. Built-in power management means taking appropriate action when the system tells you it is going into suspend. Another issue is classifying the file and configuration data used by an application, so that it works with roaming profiles. Server applications need to be aware of the Active Directory.

Will it be more stable?

The two most common reasons for Windows instability are first, mismatched versions either at system or application level, and second, bugs in device drivers. There are a couple of changes in Windows 2000 that should improve the situation.

First, there is an extensive list of protected system files, including everything in the SYSTEM32 directory on the Windows 2000 installation CD that has the extension .SYS, .DLL, .EXE or .OCX. The system will not allow these to be overwritten, except by official service packs or operating system upgrades.

Second, applications are now expected to install all their components into the application directory, increasing the likelihood of duplicate files but ensuring that each application finds the version it expects. Even COM components are accommodated, since the system is able to handle different versions of the same COM component being used by different applications, by redirecting the library loading to the application directory.

Windows 2000 will probably prove more stable than NT 4.0, and protecting system files is a great idea, but it won't be perfect. The success of the new approach will hinge primarily on Microsoft's quality control and discipline.

If you look closely at the proposals, there is some worrying untidiness. For example, there are four ways to install a protected system file: from the install CD, from a service pack, from the Windows update website, or from a QFE (Quick Fix Engineering).

This last, also known as a hot fix, is Microsoft's way of providing quick solutions to specific problems (for example a security hole discovered in Internet Information Server). With three ways to apply updates, there will still be some variety in the exact blend of system files found on individual machines.

Another worry is that Microsoft is proposing a two-track service pack programme. The idea is that one track will not introduce any new features. Called the 'Service pack track', it will only include critical fixes. The second track, called the 'Point release track', will include new features.

If all you want to do is to keep applications running, use the safe track, while if you want enhancements, then the second track is for you. You can hop on board the safe track at any point, which implies a multiplicity of service packs.

For example, you might want to fix the feature set at Windows 2000.1, but still apply critical fixes, so there will have to be separate service packs for Windows 2000 and for Windows 2000.1, and again for Windows 2000.2, when and if the time comes [Fig 1].

The Microsoft Installer

If you have looked at Office 2000, you will already have seen the Microsoft Installer, which includes clever features like 'install on demand' and 'application repair'.

The installer itself is really a service provided by the operating system, with an API and a COM interface. It comes as part of Windows 2000, and can be added to Windows 9x or NT 4.0. One of the benefits is that component reference counting should work more reliably, so that you can trust the dialog that invites you to delete a component because it is no longer used.

For Windows 2000, the message is that you have to use the installer, or fly in the face of the official guidelines. Unfortunately it is fairly complex, so in practice more developers will use an installation kit such as InstallShield or Wise rather than rolling their own setup application.

Certified applications

Use of the Microsoft Installer is mandatory if you want your application certified for the Windows 2000 logo. This is intended to be a more rigorous scheme than previous Windows logo efforts. It involves following a specification, obtainable now from Microsoft, that lays down the requirements for a well-behaved Windows 2000 application.

Developers who do not want to pay Veritest, the authorised testing body, for certification may still want to follow the guidelines. Topics covered include power management, the Active Directory, multiple monitor support, and the absence of any16-bit components.

▲ Major apps running on NT should run on Windows 2000

Apparently if you plead a strong case you might get away with some 16-bit stuff, for example to support a legacy system, but be warned: after Windows 2000 comes 64-bit Windows, which will probably not support 16-bit code at all.

SQL Server for everyone

Microsoft has quietly released the MSDE (Microsoft Database Engine) as a free update to Visual Studio 6.0. This is big news. MSDE is the database engine of SQL Server, so you can use this instead of JET (the Access engine) in applications, and still distribute them freely.

Of course, there are restrictions. MSDE is intended for up to five users only, and has a 2-gigabyte database size limit. The minimum system for MSDE is a Pentium 166 with 32 MB RAM. The main benefits are for applications where a laptop user wants to connect to SQL Server and then work with the data offline.

By using MSDE, you can use the same data access code for both the local and server databases. You also get easier replication and more reliability, since MSDE logs transactions, enabling recovery after a system failure.

After Windows 2000 comes 64-bit Windows, which probably won't support 16-bit code at all

Quick results from SQL Server

Richard Cowley asks: 'I am upgrading an application, currently written in VB3, to VB6 and SQL Server 7. I am using True DB Grid pro bound to ADO data controls. I have a Data Environment connection to the SQL Server. When I have to display a large recordset, say 16,000 records, the grid does not display any data until the entire recordset has been acquired.

Is there a way to display the grid quickly, showing enough records to fill at least 2 pages while the remainder of the recordset is being acquired? This is the way that Access works.'

This begs the question: does anyone really want 16,000 rows in a grid? They will hog memory, and few users want to scroll through that many records.

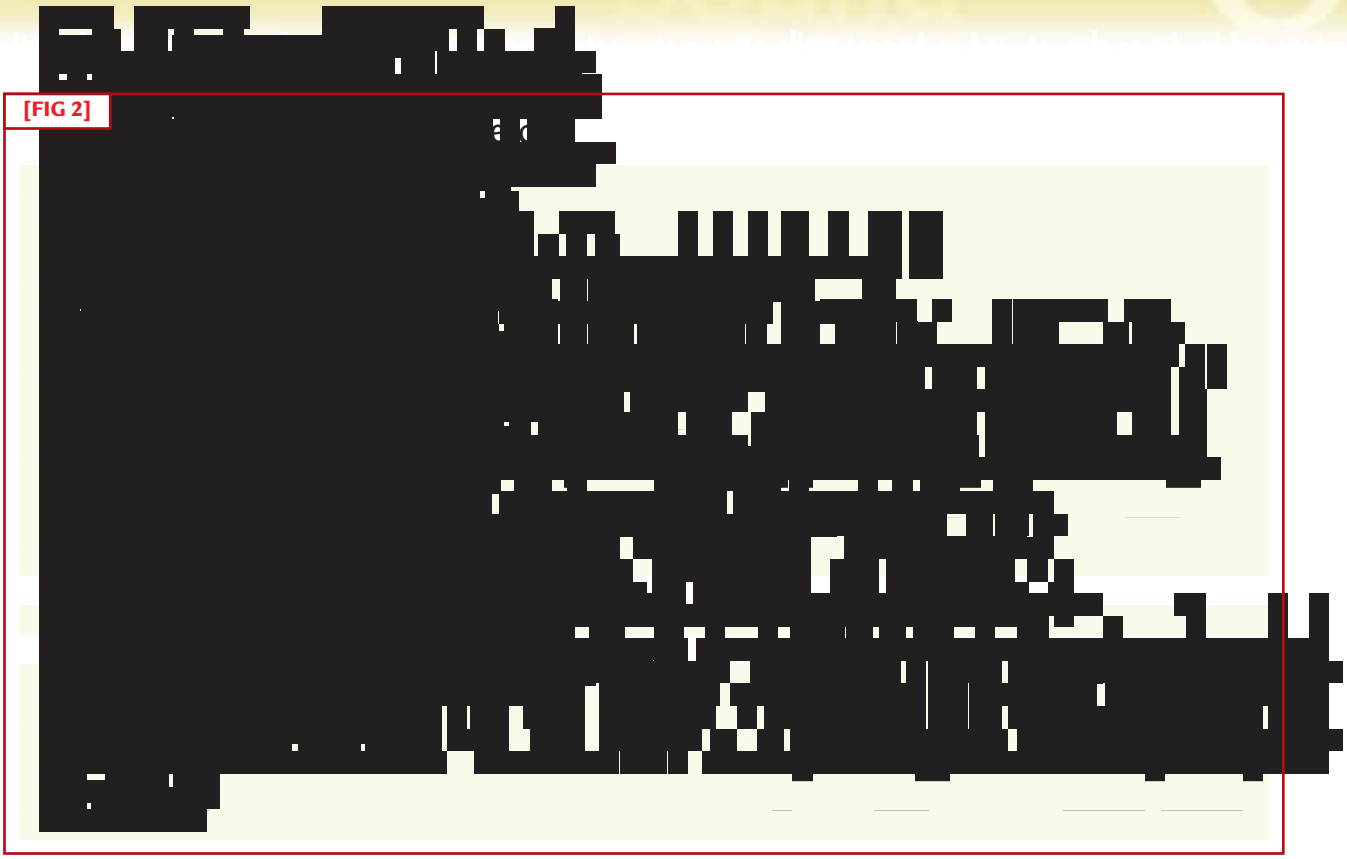
The first answer then is to think of ways to avoid the problem, perhaps by having letters of the alphabet, or regions, or product categories, that you can select to narrow down the results. Even so, there is a way to do what Richard asks and it is called an asynchronous fetch.

The idea is that the first results are returned almost immediately, so that the user has something to look at while the rest are being obtained. The bad news is that I cannot find a way of doing this through the Data Environment – reader suggestions are welcome.

Fortunately you can easily do it in code. Fig 2 shows an example. There are a few points to note. The ADO recordset object is declared using WithEvents, so that you can handle events fired by ADO. When you do this, you will find that you can select the recordset variable in the left-hand dropdown in VB's code editor. The right-hand dropdown then gives you all the available events, including FetchComplete, used here to inform the user that all the records have been retrieved. There is also a FetchProgress event, but it appears this is not really supported by SQL Server, as it only reports 0 or 1 in the current release.

A key decision in any SQL Server query is the cursor type and location.

[FIG 2]



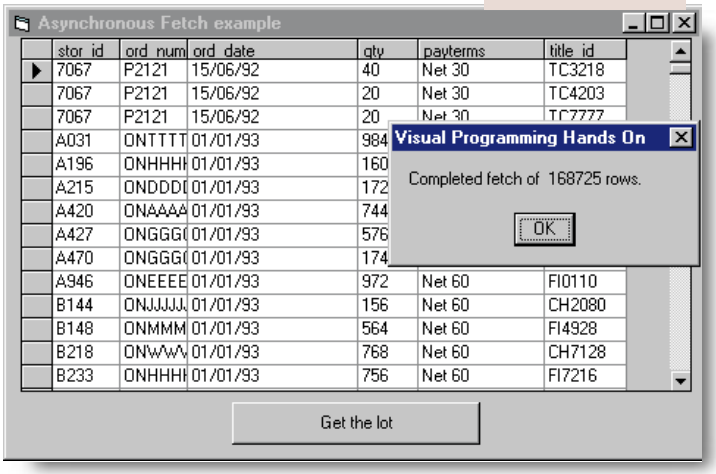
Look up cursor types in the VB and SQL Server documentation for more information. The choice here can make a huge difference to performance. The Recordset's CursorType and CursorLocation properties determine this. There is also a MaxRecords property, useful if you only require the first part of a result set.

The asynchronous fetch itself is obtained by using the adAsyncFetch constant in the Options parameter, when calling the Recordset's Open method. In this example, I got the following approximate results:

- **Standard query, unordered result set: 20 seconds**
- **Standard query, ordered result set: 30 seconds**
- **Asynchronous fetch, unordered result set: <1 second first rows, 28 seconds to complete**
- **Asynchronous fetch, ordered result set: 7 seconds first rows, 35 seconds to complete**

The figures demonstrate that although the asynchronous fetch is slower to complete, the benefit to the user is a much quicker response. If the query is unordered, it is near instantaneous. In general, you should never order a query unless you have to. Even though ordering the query reduces the benefit, it still delivers results far more quickly. Most users will perceive this as better performance, even though the overall time is longer.

▼ASYNCHRONOUS FETCH GIVES THE USER A FAST RESPONSE ON LARGE RESULT SETS



■ **Which database path?**

Richard Harrison asks: 'How would you go about using a connection string or a Universal Data Link with an application that could be installed anywhere on a user's PC?'

There are a few choices you have if you need to know the location of a file or database, but want the user to be free to install anywhere.

First, you can use a location relative to the application directory. At runtime you can detect the application path and go from there. This might not always be suitable, for example if you wanted a database on a different drive from the client application, or if it were shared between several applications.

To overcome this, you can use either an old-fashioned .INI file in the Windows directory – frowned upon by Microsoft's guidelines but very easy for you to troubleshoot – or the registry. Both of these options provide central locations for configuration data like path names, so that any application can find them.

PCW CONTACTS

Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office.

◆ *For developer information about Windows 2000, the Microsoft web site is the place to look, starting at msdn.microsoft.com. Here you can find the Application Specification as well as compatibility information. Download MSDE from www.eu.microsoft.com.*

On FireWire

Another bright spark from Apple catches hold as the computer industry feels the need for speed

Apple's adoption of USB for the iMac and its new G3 PowerMacs has been an important step forward for the Mac platform. That's why we've looked at a number of USB products in recent columns. However, USB isn't the only important new feature that can be found on the latest Macs.

Although it's missing from the low-cost iMac, all of the 'professional-level' G3 Macs include two FireWire ports. FireWire has actually been around for a few years now and, for a while, it looked like it might just be another good idea from Apple that got ignored by the rest of the industry.

Even now, Macs are still the only computer systems that include FireWire as a standard feature. However, it does look like FireWire might be taking off at last, so this seems like a good time to examine the technology, its capabilities, and its potential for the future.

FireWire is basically a kind of Super-USB. It provides the same simple plug-and-play installation, but it's much, much faster than USB. A USB interface provides a maximum data transfer rate of 12Mbits/sec. That's fine for simple peripherals such as a mouse and keyboard, or even entry-level colour printers and scanners. But USB just can't cope with the sheer amount of data involved in more demanding applications such as full-screen digital video.

FireWire can handle data rates as high as 400Mbits/sec, which leaves USB standing. In fact, when Apple first developed FireWire, back in 1994, nobody paid much attention to it simply because nobody believed that we'd ever need anything that fast.

It was the arrival of digital video that finally gave FireWire a chance to strut its stuff. A couple of years ago, companies such as Sony and Hitachi began to include FireWire interfaces in their new DV cameras, simply because it was the only type of interface that could handle high-quality, full-screen video.

So, if you've got a G3 PowerMac with FireWire built-in, you can plug a DV camera straight into the Mac and capture high-quality, full-screen video with no need for any additional hardware. Apple's QuickTime video software supports the DV format, so you don't need any extra software either.

◀ THE LOGO THAT COULD BECOME A HOUSEHOLD NAME

FireWire could spread through the entire consumer electronics industries as well

The ability of G3 Macs to work so easily with digital video is one of the reasons why Apple bought the Final Cut video editing program from Macromedia. It's rumoured that Apple is planning to bundle Final Cut with certain PowerMac models, in order to provide a low-cost, all-in-one video-editing system. Annoyingly, Apple has yet to produce a PAL version of the software that can be used in Europe, but we hope to have more information about Final Cut in time for next month's column.

It's worth pointing out that FireWire is actually known by more than one name. FireWire was the original name trademarked by Apple, but any technology that hopes to get adopted by the rest of the industry has to be ratified by the IEEE – the Institute of Electrical and Electronic Engineers. So Apple handed it over to the IEEE, who decided to call it IEEE1394. But that's not exactly catchy, so everyone carried on calling it FireWire.

However, FireWire is an Apple trademark, so other companies that use the interface in their products either have to call it IEEE1394, or give it another name entirely – Sony calls its version iLink, for example. One interface with three different names – only the computer industry could manage that.

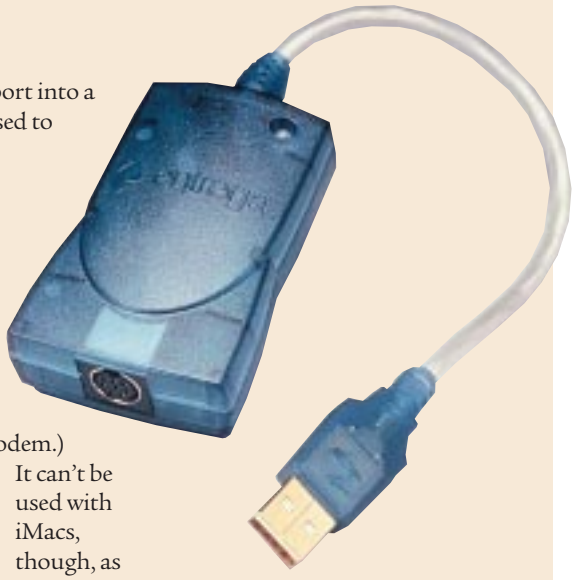
Whatever it's called, if you've got huge video files on your hard disk it makes sense to use a FireWire interface on the hard disk as well. That way you can retrieve those files and play them or edit them without having to wait ages for the files to load. FireWire hard disks are just starting to appear, and they're versatile as well as fast. You can connect and disconnect a FireWire hard disk while your Mac is running, without doing any damage. And, if you're actually playing video when the disk is unplugged, all that happens is that the video pauses on screen. Plug the disk back in and the video carries on as if nothing's happened.

FireWire could also be used in high-end printers and scanners in the pre-press industry. Low-cost printers and scanners designed for home users tend to use USB, but if you're working with huge colour graphics files you need the speed of FireWire.

More important, though, is the potential for using FireWire outside the computer industry. There is a group of electronics companies – including, er, Sony and Hitachi again – which is planning to use FireWire as a method of networking audio-visual devices such as TVs, VCRs and CD players. If this takes off, FireWire could spread through the entire consumer electronics industry as well as the computer industry.

But, Apple being Apple, there has to be a fly in the ointment somewhere. In this instance it was Apple's attempt to charge a licensing fee. It was rumoured that Apple wanted to charge a fee of $1

LET'S GET SERIAL



At long last, there are a number of USB floppy disk drives available in the UK which can be used with iMacs and G3 PowerMacs. However, until now, I've been completely stumped for an adaptor that will allow you to use other types of peripherals, such as modems and digital cameras, with these machines.

Like Mac printers, these peripherals originally used serial ports to connect to the Mac, but the entire Mac range has now abandoned serial ports and adopted USB instead. There are a number of options for using old printers with USB Macs, such as InfoWave's PowerPrint, but these tend to be designed specifically for printers, and often don't work with modems and other types of peripherals.

Fortunately, there are now two answers to this problem. The first is the Stealth Serial Port. This connects to the internal modem socket inside all the new G3 Macs and turns the modem port into a serial port that can then be used to connect any kind of serial peripheral.

I tried it with a modem, an Epson printer and a digital camera and it worked perfectly. It's easy to install, but it assumes you don't already have an internal modem in your machine. (I don't, so this is an easy way for me to use my old serial modem.) It can't be used with iMacs, though, as these have internal modems built-in.

The entire Mac range has now abandoned serial ports and adopted USB instead

The other option is Entrega's USB-to-Serial Adaptor. One end of the adaptor plugs into a USB port on the iMac or G3, while the other has a serial port allowing you to connect serial peripherals. The only drawback is that the adaptor isn't compatible with a wide range of printers. Entrega's got some useful USB gadgets in its range, but seems to have trouble with the software for the Mac versions of these products. However, take a look at Entrega's web site www.entrega.com to see if the adaptor is compatible with the peripherals you want to use.

or $2 for every single product that included a FireWire interface. That might not sound like much, but if you're Sony and you're selling millions of CD players, TVs and VCRs every year, it can soon add up to an awful lot of money. Apple eventually settled for a licence fee thought to be about 25 cents, but not before it had scared off a lot of potential FireWire licencees.

▲ THE G3 POWERMACS HAVE FIREWIRE AS STANDARD

Even if FireWire doesn't find its way into other types of electronic devices, its sheer speed makes it invaluable for working with digital video. So FireWire will probably continue to be used in Macs and in various digital video products. However, it remains to be seen whether Apple can attract enough support from the rest of the computer and consumer electronics industries to allow FireWire to reach its full potential.

PCW CONTACTS

Stealth Serial Port
Price: £49.99+VAT
Contact: Computer Warehouse 0181400 1234
Entrega USB-to-Serial Adaptor
Price: £42.55+VAT
Contact: Entrega 0118 965 7751

Cliff Joseph welcomes your feedback on the Mac column. Contact him via the PCW editorial office or email mac@pcw.co.uk

Keyed up

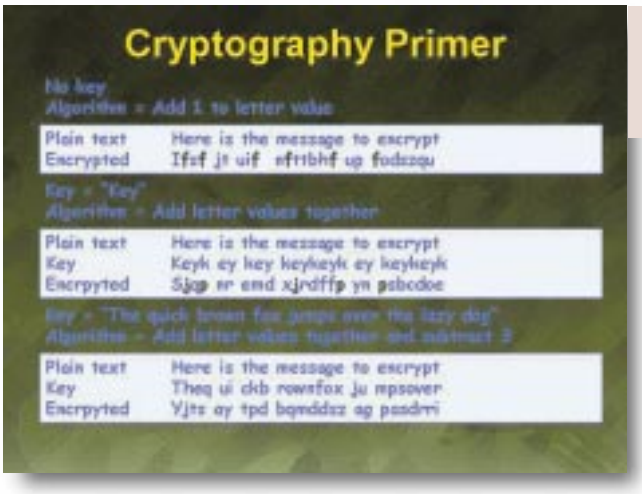
Bob Walder unlocks the facts you need to protect data being shared over unsecured links

If you have been following our advice in recent months you will have looked at Internet and network security issues, as well as implementing email services – whether using an ISP or hosting your own mail server.

These areas are not exclusive and it is at this stage that you should consider email security. But before we jump into the practicalities of implementing public key security, we need to cover some of the theory behind it. Basically what we are talking about is encryption – to keep the content of your messages private – and digital signatures to authenticate the origin of those messages.

In the best tradition of the James Bond novel, encryption is all about secret codes, transforming plain text into a form unreadable by anyone without a secret decryption key. Its purpose is to allow secure communication over a general-purpose insecure channel, such as the Internet.

Although the mathematics behind it can be very complex, encryption itself is pretty straightforward. Cast your minds back to when you were kids and you wanted to send secret messages to each other. The simplest form of encryption was the one where every letter of the alphabet was substituted for the one 'n' positions following it.

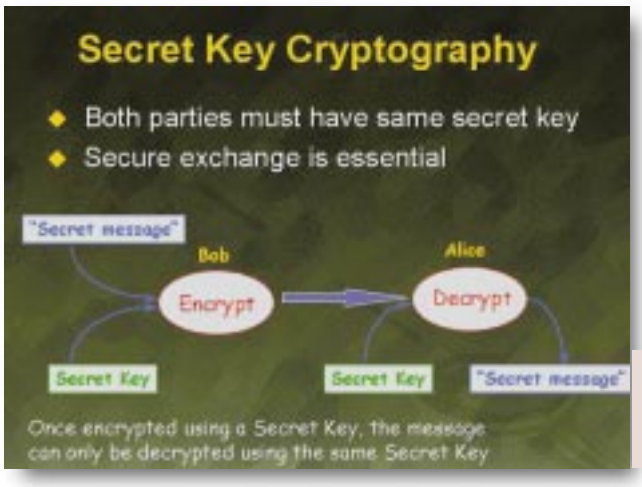


◀ENCRYPTION IS EASILY EXPLAINED AS A CHILD'S SECRET CODE

The two important buzzwords in this field are key and algorithm. The 'key' represents the number of positions we are shifting the letters, while the 'algorithm' is simply the idea that the encrypted letter is the one 'n' places following the plain text letter. Using this logic, encrypted text = plain text + n.

There are two ways you can beef up security on this front: increase the length of the key and devise ever more complex algorithms. Luckily, we don't have to create our own algorithms, as there are perfectly acceptable standards out there. The most widely used standards are DES (Data Encryption Standard), triple DES, IDEA (International Data Encryption Algorithm) and RC4 (an algorithm developed by Ron Rivest of RSA as a stream cipher with a variable key length).

Whereas the original DES algorithm uses 56-bit keys, later and more powerful systems use much longer ones, forcing potential hackers to run through trillions of combinations in any attempt to find the right one by brute force. Triple DES is an enhanced version of the original DES algorithm and encrypts data three times using three different keys (providing an effective key length of 112 bits). IDEA is a 128-bit mechanism developed by the University of Zurich in 1992 and is currently a favourite of European financial institutions.



◀WITH SECRET KEY ENCRYPTION BOTH PARTIES NEED A KEY TO SWAP DATA

Secret Key Cryptography

As you would imagine, the longer the key length, the more secure the encryption. Going back to our simple cipher, if our single digit key is represented by a letter of the alphabet, a potential hacker only has to try 26 possible combinations in order to crack the code. Now, if we increased the length of the key and wrote it beneath our original message (repeating the key over and over until it was equal to the length of the message), each character in the key would represent a different shift for the letter above. Of course, if short keys are used, then repeating patterns may begin to emerge in the message. The most secure method is therefore to use a key the same length as the message itself, but this is impractical in real life situations. Combine long keys with sophisticated algorithms, however (something more complex than 'shift each letter of the message by the value of the key character beneath') and you are in business.

Unfortunately, 'secret key' (or 'symmetric key' cryptography as it is known) relies on both parties involved having access to the same secret key. This is because the sender uses the key to encrypt the message, and the receiver uses the same key (together with the

A MUST HAVE FOR YOUR BOOKSHELF

Travelling quickly through what the author calls the 'basic transports and plumbing', the book covers the OSI model and everything about the various network interfaces and services, before giving us all the gen on the multitude of Internet transport protocols – IP, TCP, UDP, ICMP and so on. No frills, no fuss – just a solid reference manual for anyone involved with the Internet.

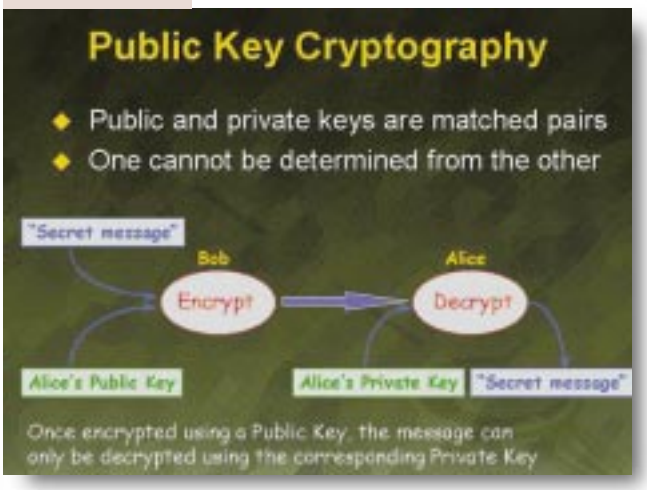
Title: **Internet Standards and Protocols**
Author: **Dilip C. Naik**
Publisher: **Microsoft**
Price: **£27.49**
ISBN: **1-57231-692-6**

same algorithm in reverse) to decrypt the message. This introduces a potential problem – how do you ensure that the key is distributed in a secure manner?

If you have regular contact with the person, you can pass the key face to face – you cannot get much more secure than that. In business terms, secret keys (such as bank PIN numbers) are often sent out by mail in special tamper-proof envelopes. They can also be encapsulated in hardware devices such as smart cards, where the issuing authority never gives the customer access to the key information at all.

But in the case of one-off Internet transactions with hitherto unknown parties, we do not have that luxury. As a result of the unique key-pair arrangement between the two parties, it is impossible to exchange data with someone to whom you have not already been 'introduced'. Neither of you has a shared secret key, and there is no secure channel over which to exchange one. For this reason, secret key cryptography works best when a single issuing authority maintains a service for a user base. Information can then be safeguarded by a registration process that takes place prior to the exchange of data.

▼PUBLIC KEYS CAN BE PUBLISHED OPENLY BUT STILL REQUIRE THE PRIVATE KEY TO BE DECIPHERED



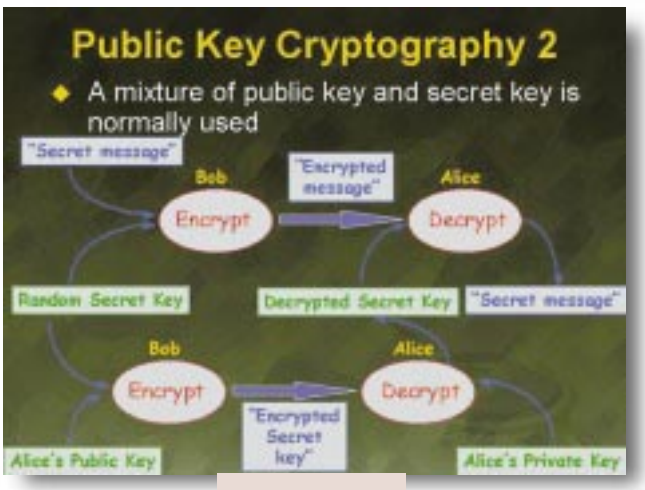
Public Key Cryptography

One way of overcoming the problem of secure transactions with partners you have had no previous dealings with is to use 'public key' or 'asymmetric key' cryptography. The mathematics behind public key cryptography are exceedingly complex, but the procedure can be explained fairly simply. Using this system each person gets a pair of keys, known as the public key and the private key. The public key is generated from the private key using a complex algorithm, following which the public key can be published, while the private key remains secret.

Any message that is encrypted with a given public key can only be decrypted using the corresponding private key, and there is no known way to derive the private key from the public key.

Now, if Bob wishes to send a message to Alice, he will encrypt it using Alice's public key (which can be published in a directory or distributed via unsecured e-mail). The only person who can decrypt the resulting message is the holder of the appropriate private key – in this case Alice. Thus, the need for sender and receiver to share secret information is eliminated, since all communications involve only public keys, and no private key is ever transmitted or shared. The best known and most widely used asymmetric key technologies are Diffie-Hellman and RSA.

Although providing the highest levels of security, public key cryptography is notoriously heavy on system resources, particularly when working on large messages. For performance reasons, therefore, RSA is usually used only to exchange keys, whilst a conventional



▲MIXING TYPES OF ENCRYPTION CUTS DOWN ON USED RESOURCES

secret-key cryptography system (such as DES) is used for the bulk of the message.

Suppose Alice wishes to send an encrypted message to Bob. She first encrypts the message with DES, using a randomly chosen DES 'secret' key, which can be different for every message sent. Then she looks up Bob's public key and uses it to encrypt the DES key. The DES-encrypted message and the RSA-encrypted DES key together form a 'digital envelope'. Upon receiving this digital envelope, Bob decrypts the DES

PCW CONTACTS

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leisure lines

Soul long, suckers

Crystal Dynamics released its flagship title **Legacy of Cain: Soul Reaver** in late August, a gothic 3D action affair. You play Raziel, a creature who roams the world absorbing the souls of the victims that he kills. Beginning without any weapons and few skills, you roam the open environment, using objects that you find and learning skills from the people you meet to complete the game. Crystal Dynamics is especially proud of its 'Predator AI', which allows enemies to learn your moves and hunt you down.

▲THE WEST GETS WILD IN THE TIE-IN GAME TO THE WILL SMITH MOVIE

If you have ever fancied being a true swashbuckler, check out **Cutthroats**, a pirate strategy from Hothouse Creations. As the commander of a pirate ship, you must work your way up from a small trading vessel to a galleon, by stealing cargo from innocent ships and raiding Spanish towns. Check out www.eidos interactive.com for more on both titles.

Sold Out tries to increase its budget market presence with the introduction of its Extreme range, re-releasing older games for only £9.99. Launched on the ninth day of the ninth month of 1999 (when else?), the initial titles are **Dark Colony**, **Special Ops**, **Three Lions** and **Archipelagos**.

SouthPeak Interactive is hoping that all the hype surrounding the Will Smith film **Wild, Wild West** (above) will rub off on its tie-in game. The developer and publisher is claiming that the game will combine the 'irreverent humour of the movie with adventure puzzle-solving and twitch action'. Check out: www.southpeak.com for more details.

A game of conquerers

After what seems like an eternity of waiting, the Command & Conquer saga is set to continue. Command & Conquer was, and still is to many die-hard advocates, the definitive real-time strategy game. Tiberian Sun sees the continuing struggle between the GDI or Global Defence Initiative (the good guys) and the Brotherhood of Nod (the bad guys).

◀STRAP ON YOUR GOGGLES AND SEEK OUT YOUR ENEMY

Due for release on the 26th of August, Command & Conquer: Tiberian Sun will undoubtably be one of the biggest games of 1999. If the initial sales of Red Alert (the last C&C title) are anything to go by, you should probably reserve your copy early.

With almost all the big PC releases looking like first person shooter clones, it's good to see something different on the horizon. Don't forget, the Global Defence Initiative needs your help to defeat the evil Kane.

www.tiberiansun.com

Top 10 products

Last month

Windows software

1	**Office 2000 Premium ug**	**Microsoft**	-
2	Norton Anti-Virus v5 std	Symantec	5
3	MSWorks v4.5	Microsoft	8
4	Office Pro 2000 CD/ug	Microsoft	-
5	MSOffice Pro 97+books ug	Microsoft	4
6	WINDOWS 98 CD/ug	Microsoft	6
7	MSOffice 97 std v/comp	Microsoft	7
8	Windows 98 v2.0 ug	Microsoft	-
9	Uscan v4 classic	Net_associ	10
10	McAfee Office	Net_associ	-

DOS software

1	**Turbo Pascal v7DOS edu.**	**Borland**	1
2	MS DOS v6.22 ug	Microsoft	-
3	PC DOS 2000 v1CD	IBM	2
4	Novell 3.12-4.2 5-user ug	Novell	-
5	Laplink v5 Ttraveling	3	
6	Netware 3.2 5-user ug	Novell	-
7	Netware 3.2 5-user	Novell	-
8	Novell Sup Conn Monthly CD	Novell	-
9	MS Mail PC Remote 3.2	Microsoft	-
10	Groupwise ug 5.5 5-user	Novell	-

Peripherals

1	**32Mb 8x32 60ns EDO 72pin**	**GSI**	4
2	16Mb 4x32 60ns EDO 72pin	GSI	2
3	Delta 44X Int EIDE CDROM	?	-
4	64Mb 100MHz SDRAM	GSI	7
5	Stylus Photo Color 750	Epson	6
6	Stylus Color 640 1440dpi	Epson	9
7	Stylus Color 740	Epson	-
8	32Mb 168pin SDRAM mod ug	GSI	-
9	HP De skjet 420 colour	Hewlett	-
10	128Mb 100MHz SDRAM	GSI	10

CD-ROMS

1	**Star Wars: Ep 1 Insiders Guide**	**LucasArt**	1
2	Dance EJ2	Fast Trak	-
3	Music Makers Three	Magics	-
4	Music Studio	Magics	-
5	Simpsons Virtual Springfield	Fox Interact	-
6	South Park Screen Saver	Telstar	4
7	Simpsons Cartoon Studio	Fox Interact	-
8	Austin Powers	Cendent	-
9	X-Files Interactive Guide	Fox Interact	-
10	Dance EJ2 Sample Kit	Fast Trak	-

Games

1	**Kingpin**	**Activision**	2
2	Hidden and Dangerous	Take 2	4
3	Alien vs Predator	Elect.Arts	1
4	Half Life: Game of the Year	Take 2	-
5	Championship Manager Three	Eidos	6
6	Rainbow Six: Gold Edition	Take 2	10
7	Dungeon Keeper Two	Elect.Arts	3
8	Flyl	Elect.Arts	-
9	Phantom Menace: Ep 1	LucasArt	-
10	Star Wars: Ep 1 Insiders Guide	LucasArt	-

Games and CD-ROM figures supplied by HMV. Others from Software Warehouse.

Kingpin: Life of Crime

Turning to crime can help you get your revenge in this X-rated and darkly atmospheric thriller.

Kingpin carries a BBFC age certificate claiming to be suitable for over 18s only. The reason for this is threefold: the subject matter, the on-screen violence and the explicit language.

It's easy to think of Kingpin as just another first-person shooter, but it has something that's woefully absent from so many games in this genre – a plot. Anyone who watched and enjoyed the Mel Gibson movie *Payback* will love this game. Like Gibson, you find yourself lying on the floor in a very bad way, with only one thing on your mind – revenge.

You begin the game in a seedy back-alley with only a handy lead pipe for a weapon. Your first major problem is finding yourself a gun, but this isn't as simple as it sounds. The local pawnshop is more than willing to supply you with a pistol, but you'll have to rob a warehouse in order to pay for it.

The visuals can't be described as ground-breaking, but the rundown and decayed city streets set the scene perfectly. You'll encounter a multitude of shady characters, each one looking like an extra from *The Crow*. Sound is also first rate, with very effective directional effects making it easy to tell if someone is around the next corner.

3D support is OpenGL only, so make sure your card supports it before you buy. Of course there's a multi-player death-match option, but Kingpin comes into its own as a single player game.

RIYAD EMERAN

PCW DETAILS

★★★★

Price *£39.99*

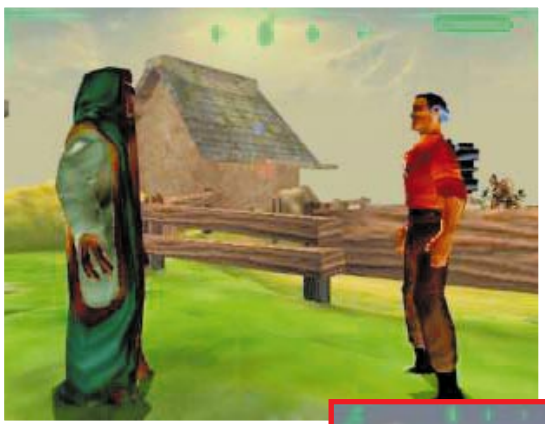
Contact *Interplay 0171 551 0000 (Virgin)*

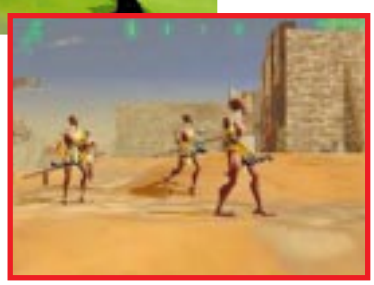
www.urbangangsta.com

System Specification *Pentium 233, Windows 95/98/NT, 64MB RAM, 570MB Hard Disk, 4x CD-ROM, DirectX-compatible soundcard, OpenGL-compliant 3D accelerator*

Outcast

Life's tough enough as a Navy SEAL, without finding yourself stuck in a parallel world.





Waking up in the parallel world of Adelpha with a splitting headache is nobody's idea of a good start to the day, unless of course you are a US Navy SEAL by the name of Cutter Slade.

Outcast is spread out over six different geographical regions, all of which are immense, interspersed with villages, towns, lakes and the like.

Essentially an action/adventure, Outcast lets you choose between a first and third-person perspective. You have the dual mission of helping out a local tribe and finding the probe that sent you there in the first place.

The programmers have unusually chosen to forgo the 3D graphics cards so loved by most PC games today. Instead, they've plumped for a relatively unused procedural technology known as voxels. So you don't need a powerful 3D card, but you do need a powerful processor – a Pentium III ideally – and lots of memory.

As well as traipsing around the lush scenery, the game involves lots of talking to the locals. It's a little tricky to remember their names as they use a daft, incomprehensible language, but it proves to be time-consuming and enthralling in equal measures. Outcast is unlikely to fade quickly, with its large variety of weapons and gadgets, and the chance to ride the kangaroo-like wildlife through six different worlds.

JIM HARYOTT

PCW DETAILS

★★★★

Price *£40*

Contact *Infogrames 0161 827 8000*

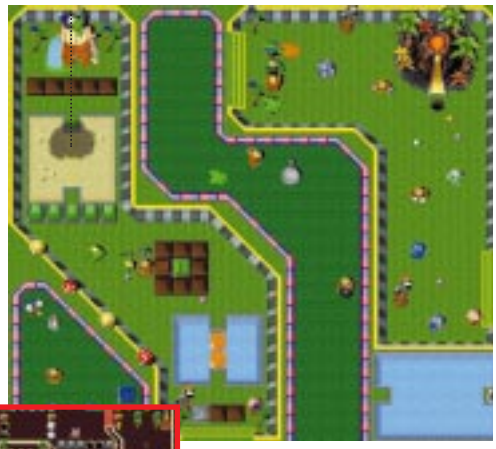
www.outcast-game.com

System Specification *Windows 95/98, Pentium 200MHz processor (PII 300MHz recommended), 32MB of memory, (64MB recommended), 500MB of free hard disk space, quad-speed CD-ROM drive, (8-speed recommended), 1MB graphics card, (2MB card recommended), soundcard*

Gruntz

Well I never... Lemmings with a sense of survival! A deceptively simple and seductive game.

The intro movie for Gruntz started recollections of the gross character *Fungus the Bogeyman,* who terrorised the kids years ago, but once the game gets going those fears are quickly dispelled. The child-like creatures of the title are in fact incredibly cute, with any offensive noises passed off as endearing mischief.



The excitement begins after curiosity gets the better of the Gruntz and they are whisked away through a twisting worm-hole into an unknown land. Thus begins their long, perilous journey home, with your help as their leader, tackling devilishly tricky puzzles and mischievous enemies on the way.

Played from God's perspective, the eight themed worlds scroll across the screen as you begin locating and assembling eight magical Warp Stones. At your disposal are over 60 unique tools, toys, power-ups, secret items and spells to help you navigate through the puzzles and defeat unwary enemies. In a sticky situation, you could either grab a big club and act offensive or try and distract the enemy with a shiny yo-yo.

As well as the single-player quest mode there's the opportunity to battle your tribe of Gruntz against up to four players over the Internet or LAN in the multi-player battle mode. Family appeal is heightened through a simple learning curve to the game's schematics with an option to advance the basics for adults.

Although not the most stunning game graphically, it has long term appeal through sheer game play alone.

IAN ROBSON

PCW DETAILS

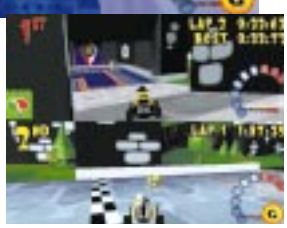
★★★

Price *£19.99 inc VAT*
Contact *Codemasters 01926 814132*
www.gruntz.com
System Specification *Pentium 133 or equivalent, 32MB RAM, 2MB SVGA video card 100MB free hard-disk space, 4x CD-ROM, Windows 95/98*

Lego Racers

Fancy a day at the races? How about kit car racing fun with knobs on – Lego style!

To put it bluntly, Lego Media International's latest game is the Lego version of MarioKarts. You select from a group of cute characters (our favourite being Joan Of Kart) and choose from a number of themed wacky courses.



The game is based on Lego's popular themes of Pirates, Castles, Space and Adventurers. There are a number of racing options, the main competition being the circuit races where the Rocket Racer challenges players to defeat all the greatest Lego Racing champions of the Lego Systems.

Lego Racer's most attractive feature, which we know kids and adults alike will love, is that players can build their own cars and customise drivers by selecting pieces in the Lego garage. Car handling is user friendly and game movement is impressively smooth, with multiple-view perspectives and accelerated 3D graphics.

Experienced racing game drivers won't find it hard to conquer this game within their first few attempts, although to be fair, the target Lego Racers audience is aged six and above, and a large proportion of all current Lego fans are under 10. But you don't need to be a Lego enthusiast to enjoy this game.

Lego Racers does succeed along with most other racing games in that it can become extremely addictive and a lot of fun. For a great laugh we'd recommend the two-player mode to pit your driving wits against your friends.

MATTHEW HOWARD

PCW DETAILS

★★★

Price *£34.99 inc VAT*
Contact *Lego Media International 0181 600 7200*
www.lego.com
System Specification *Windows 95/98, 210MB(Hard Disc), 4MB Direct 3D video card (8MB recommended), High Colour resolution 16-bit (640x180 minimum), Direct sound card, P166 MMX (P200 MMX recommended)*

Alien versus Predator

Blood and butchery are the bangs for your bucks – if it moves shoot it, chop it or tear it apart.

It's a good job we've had a few years to get used to violence and blood in PC games, judging by this gory offering from Fox Interactive.

Alien versus Predator is a fast-paced gruesome shoot-em-up in which you play an Alien, a Predator or a Colonial Marine in three entirely different landscapes. There are 17 missions in total, six for the Marine and Predator, and five for the Alien. But in order to tap into the bonus levels and weapons you must complete each one on all three difficulty levels – no mean feat.

Each character has its own strengths and weaknesses. The Predator can make himself almost entirely invisible, and has a fearsome array of weaponry. As a Marine you are the weakest but you have the biggest arsenal to choose from, and you also have a tracking device, telling you if any unsavoury beast is in your vicinity. The Alien has only his jaw, tail, and what pass for hands – but it can clamber over any surface and cling to the ceiling.

With sensational graphics, plus blood, limbs and gunge aplenty, Alien versus Predator is not for the squeamish. But in the form room of first-person shooters, it's top of the class.

JIM HARYOTT

PCW DETAILS

★★★★

Price *£40*

Contact *Fox Interactive (through Electronic Arts) 01753 549442*
www.foxinteractive.com

System Specification *Windows 95/98, Pentium 200MHz processor (Pentium II 400MHz recommended), 32MB of memory (128MB recommended), 200MB of free hard disk space (400MB recommended), quad-speed CD-ROM drive (24-speed recommended), DirectX compatible sound and 3D graphics cards*

Amerzone: Explorer's Legacy

Jungle fever on a giant scale with this fun-packed frolic from France.

The Amerzone was originally a cartoon series designed by French writer and graphic artist Benoît Sokal. Now it has been re-shaped into an interactive PC adventure game boasting some outstanding graphics and a surreal plot.

Amerzone is a 3D-adventure game, much like the classic Myst and Riven titles. However, this whopper has four CDs' worth of hazardous peril – enough to make even Indiana Jones jealous. Written by French developers Microids, it upholds that country's tradition of producing incomprehensible games.

Your quest takes place in an imaginary country lost in the depths of South America and ruled by a power-crazy dictator. The storyline revolves around the legend that God created the 'White Birds' in order to give the Indian race eternal life. Since a sorcerer stole the eggs, though, a malediction has hit the Amerzone. You play a journalist who is the only one able to save the country from chaos. Armed with just your rucksack and journalistic endeavour, you have been sent to investigate the political and ecological goings on in the Amerzonian jungle.

The interface is very simple, to appeal to the less hardened adventure gamers, but the game is peppered full of taxing puzzles. If you don't like having to switch CDs, then take comfort from the knowledge that a DVD version is promised for October.

LUKE PETERS

PCW DETAILS

★★★★

Price *£34.99*

Contact *Codemasters 01926 814132*
www.amerzone.com

System Specification *Windows 95/98, Pentium 166MHz processor (Pentium 200MHz recommended), 32MB of memory (64 MB recommended), 100MB of free hard-disk space, 8-speed CD-ROM drive, 2MB graphics card (4MB recommended), Soundblaster compatible soundcard*

Baldur's Gate

So, you've got a weekend to kill and no friends. How about a relaxing trip to the Sword Coast.

Baldur's Gate is a sprawling game of heroes and magic, based on the original Advanced Dungeons and Dragons rules and boasting five CDs full of beautifully rendered graphics. The Tales of the Sword Coast is only one CD, but it has subtle enhancements that Interplay added at the request of fans, as well as new areas to explore.

You start by choosing what type of character you want to play: fighter, wizard or thief, or a number of combinations. You take the role of a young adventurer, cast out from your home and forced to wander the Sword Coast. Your mission is to find out what makes you special and why people seem to be trying to kill you. As well as these assassins, there are plenty of monsters and rogues that are out to get you.

But the game is not just about hacking and slashing: there are allies along the road who may join you (and you'll need their help!) As you wander you will hear gossip and rumours, and these are recorded in your personal journal, which serves as a handy reference. Complete a mission and there could be rewards of gold or magic items.

Those familiar with the Advanced Dungeons and Dragons rules will have a head start, but it is not essential. These rules have been modified to allow the players to concentrate on the role-playing aspect of the game. With Baldur's Gate, the computer does all the dice-rolling, while you just enjoy making the right decisions.

BARRY DE LA ROSA

PCW DETAILS

★★★★★

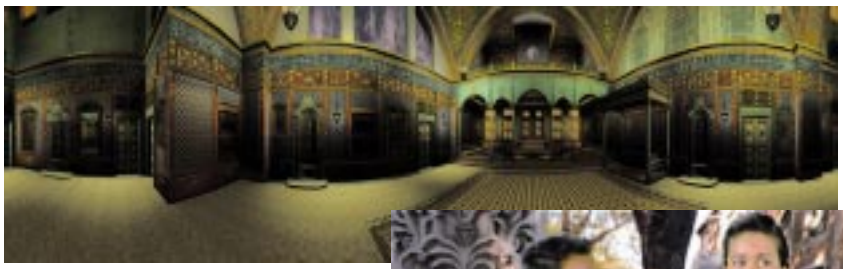
Price *£39.99 (Baldur's Gate), £19.99 (Tales of the Sword Coast)*
Manufacturer *Interplay 0171 551 4266*
www.interplay.com
System Requirements *Pentium 166MHz or equivalent, Windows 95 and DirectX 5 or better, 16MB RAM, 300Mb Hard Disk space, 4X CD-ROM, 2MB video card*

Byzantine – The Betrayal

Investigating this box of Turkish delights may leave you drooling over your next holiday.

A summons from a friend finds you in modern day Istanbul, as an investigative journalist. After being questioned by the police, you're left in your absent friend's apartment. You have in your inventory just a few items, to which you must search out and add other objects along your quest. Following the trail of your friend's prophetic words, your mission is to uncover the truth behind the legacy of a lost civilisation. To fail is to perish.

Each scene you find yourself in, you must explore – looking for clues and objects left for you. The things you acquire may get you out of difficult situations. By examining your objects, you'll find you can progress through the game, while a map guides you each time you leave a scene. New places to visit appear as you advance on your quest.



As part of the interactive adventure, you can converse with some of the characters you encounter, or eavesdrop on their conversations, while real-video sequences treat you to a tourist's eye-view of the city. However, although you get 360-degree vision, your directional movement is limited.

The game is not hugely challenging, but it is enjoyable, and gives a great taste of Turkey if you're interested in going. The country's history and culture appear to have been well researched for this action-adventure, where you must trust no one and suspect everyone.

HELEN FORTGANG

PCW DETAILS

★★★

Price *£29.99*
Contact *Marshall Media 0171 291 8222*
www.marshallmedia.com
System Requirements *Windows 95/98; Pentium Processor 90+; 16MB of RAM; Windows compatible sound card; video/audio card; 2MB of video RAM*

Hemera Photo Objects

Worried about your image? This library of 25,000 alternatives lets you illustrate your best points.

If you need to make a snazzy website, document or PowerPoint presentation you could find yourself running around town with a digital camera, madly trying to source original material to illustrate it.

Or you could let someone else do the hard work for you and use a few of the images from this mammoth collection of 25,000 professionally taken and archived photos. Subjects range from chocolate biscuits (a personal favourite) to cats, and from love to traffic signs. Once you've selected your photo, the program will lead you step-by-step through a simple optimisation process, asking you what sort of application you'll be using, and letting you set attributes such as image size and whether or not it has a transparent background. The image will then be grabbed from one of the CD ROMs and dropped onto the drive of your choice.

Photo Objects' second function is to make your text more visually pleasing by applying images to otherwise bland standard characters. The images replace the uniform colour, making them suitable for use as a banner across the top of a web page. Changing the image is a simple matter of clicking on a new icon, and your own images can easily be imported and incorporated.

NIK RAWLINSON

PCW DETAILS

★★★★

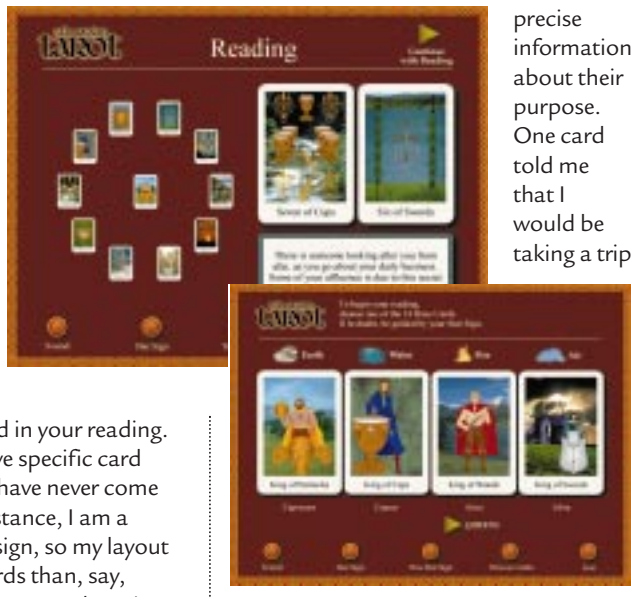
Price *£49.99*

Contact *Hemera 0171 372 9733*
www.hemera.com

System requirements *IBM-compatible 486 PC, 8MB RAM, Windows 95 / 98 or NT4, 15MB hard drive space, 256-colour VGA display*

Fifth Realm Tarot

Your future could be on the cards if you try out this tarot-reading software.



Like other tarot software, Fifth Realm provides you with interactive card readings. You are asked to choose the card that corresponds with your star sign and are given a card layout. You then use the cursor to pick the cards you want to have included in your reading. Certain star signs have specific card layouts, something I have never come across before. For instance, I am a Capricorn, an Earth sign, so my layout included far more cards than, say, Aquarius, an Air sign. No explanation was provided for this.

One by one the cards are turned over, but unlike a traditional tarot reading, the meanings of the particular icons are not read to you. Instead you are given very precise information about their purpose. One card told me that I would be taking a trip to Florida. One wonders how a card could possibly interpret such a thing, and via a computer!

Other sections in this software include horoscopes. There is information for each of the 12 signs on personality, love and partners, career and characteristics. Another section called True Star Signs, raises the question as to whether your present sign is actually your real one. By filling in details such as your birth date and time, the computer works out your true sign and also tells you the day of the week you were born.

Unfortunately, as good as this software is, I couldn't help feeling I'd rather have visited a genuine tarot reader.

ETELKA CLARK

PCW DETAILS

★★

Price *£19.99*

Contact *Attica Interactive 01865 791346*
www.attica.com

System Requirements *Win 95/98, P90, 16 MB RAM, 4MB hard disk space, 16-bit soundcard*

All about me

If you want your kids making Identikit images of Mum and Dad, this is the perfect package.

All About Me is the perfect interactive scrap book for children to keep information concerning everything personal to them.

Aimed at ages five to eight, the software includes a secret diary and sections to fill in about the family, school and hobbies, friends and pets. In each section the child can create pictures that resemble friends or family members and can keep a record of stories or personal feelings concerning these people.

There are added sections within the main headings. Here children can input details about when they were born, what their first words were, how old they were when they learnt to ride a bike or tie their shoe-laces and what they would like to do when they grow up. Although bright and colourful, the categories of careers to choose from were limited. They included being a musician, a fire fighter and a ballet dancer. Yet there are many kids who want to be a footballer, bus driver or scientist, but there was no option for them to input this if they wanted to.

It is evident that a lot of thought and effort has been put into this software to ensure the maximum educational benefit for the child.

This package is very clear and simple for children to use unaided. It would certainly help to develop writing skills, self-expression and encourage creativity while providing the child with a 'secret' record they can call their own.

A brilliant idea that is bound to be a big hit with the children.

ETELKA CLARK

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price: *£19.99*

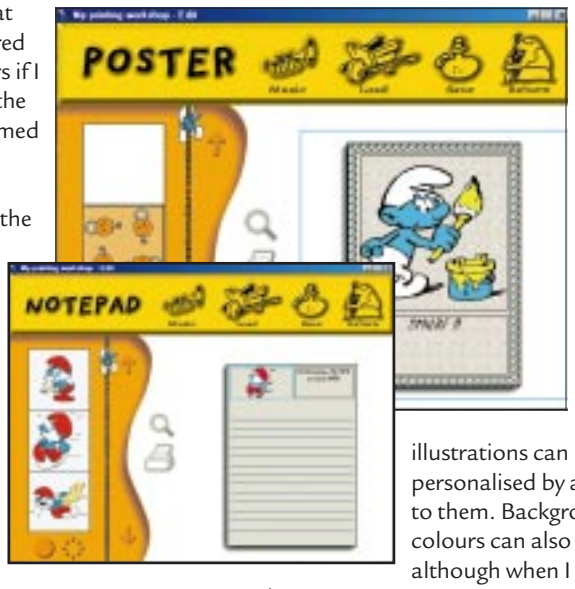
Contact: *Dorling Kindersley 0870 010 0350 www.dk.com*

System Requirements: *Win 95/98, 486/33MHz, 10MB hard disk space, 8-bit soundcard*

The Smurfs Printing Workshop

Smurf's up! And they're running amok over your stationary and inside your PC.

I would need at least a hundred toes and fingers if I were to count the amount of themed printing workshops we have seen over the last year or so. I'm afraid to say that The Smurfs isn't much different from the others.



The templates that children can work from are basic, consisting of sections for greeting cards, invitations, posters, certificates, postcards and notepaper. Each of these activities can be printed either horizontally or vertically.

Once a template is selected, children can choose from a range of Smurf pictures to decorate their stationery with. The bold and colourful illustrations can be personalised by adding text to them. Background colours can also be altered, although when I attempted this the colours I chose didn't seem to correspond with the colours appearing on my activity. I clicked on pink and the background turned grey. Green turned to blue and orange turned yellow.

This package also includes a 'CustomSmurfer' feature, which allows children to customise the Windows 95 environment. They can change screen savers, the cursor shape, icons, fonts and add background wallpaper. This however, may require adult supervision!

Including the Smurfs as part of this package will certainly appeal to a young audience. But without the little blue fellas there would be little to tell it apart from other printing software. Still, for a tenner you can't go wrong.

ETELKA CLARK

PCW DETAILS

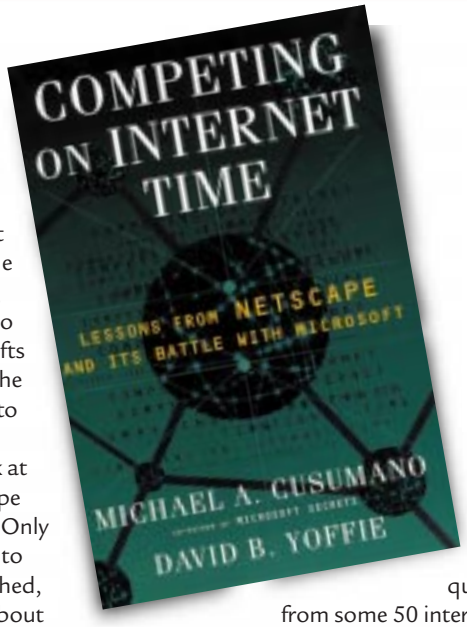
★★★

Price *£9.99*

Contact *Europress - 01625 855000 www.europress.co.uk*

System Requirements *Win 3.1 or 95, 486SX25 or higher, 8MB RAM, 25MB hard disk space.*

Competing on Internet Time



Knowing this book was just about to be released, the authors must have been kicking themselves when the AOL/Netscape merger was announced. Although it's a business analysis of how a company can successfully compete in the internet environment, it uses Netscape as the prime example, and champions the company greatly, citing it as the anti-Microsoft success story.

How ironic, then, that the company should now be swallowed up by AOL. The thrust of the book loses nothing to that, though, as it's a historic insight into how a young upstart, with no burdening infrastructure and a real-world mentality, was able to jump right into the major league by using the internet as its primary marketing channel. Essentially, it was able to mobilise faster than the Microsofts and IBMs because the speed of the Internet environment enabled it to be light on its feet.

The book is more than a look at the legal battles between Netscape and its rival Microsoft, however. Only a portion of the book is devoted to this, the rest being a well-researched, in-depth analysis of everything about Netscape, from the design of the browser software to marketing and distribution. It's actually a book for product and project managers – something that would help them to see both the pitfalls as well as the successes.

Written in an accessible style, with quotes from some 50 interviews interspersed throughout, *Competing on Internet Time* is compelling and enlightening, although it will really appeal only to those who want to do more than scratch the surface of the Netscape story.

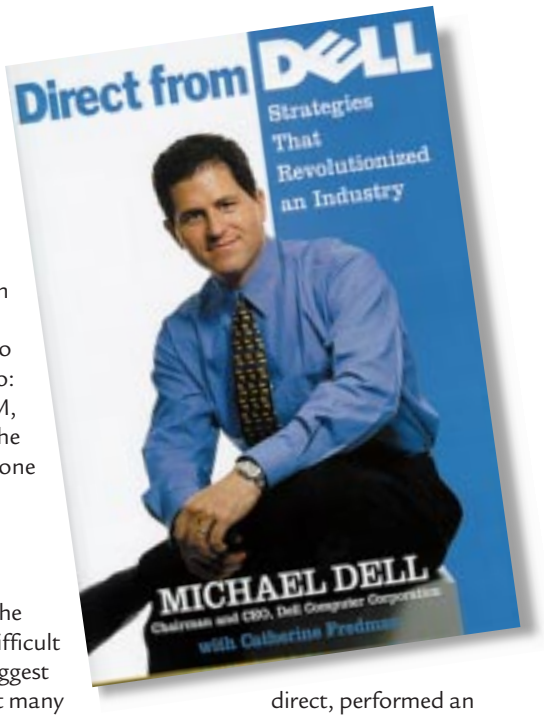
Steve Masters

PCW DETAILS

★★★★

Competing on Internet Time
Authors *Michael A Cusumano and David B Yoffie*
Publisher *Free Press*
ISBN *0684853191*
Price *£17.99*

Direct from Dell



Michael Dell is a remarkable success in business terms and a pleasant personality in social terms. He has now written his autobiography, *Direct from Dell*, published by Harper Collins. Dell, according to the book, is the archetypal American entrepreneur.

At the age of 12 his best friend's father was a stamp collector and Michael got interested. But, as he admits, he soon noticed that the prices of the stamps he was collecting were rising and, encouraged by his stockbroker mother, he bought as many as possible from friends, wrote and mailed out a catalogue and then began selling direct. Dell's reasoning was that auctioneers did nothing unless it showed a profit, and that he could easily undercut their rates and make money.

He later bought an Apple computer and took it apart to find out how it worked, much to his parents' chagrin. When IBM introduced its PC in 1981 he switched allegiance, claiming that he recognised that IBM would be a machine that would be used in business while Apple would be confined to the home and design niche markets.

By the age of 18, according to Dell, 'I knew what I wanted to do: build better computers than IBM, offer great value and service to the customer, and become number one in the industry.' Dell has not yet made it to number one in the industry but the company is consistently in the top five.

Michael Dell concedes that the concept of selling direct was a difficult one to get across: 'One of the biggest barriers to selling direct was that many potential customers had a perfectly understandable fear of shelling out $4000 to a company they'd never heard of without a physical store to walk into.' Dell managed to solve the problem by offering a 30-day money back guarantee.

By 1997 those in the industry such as Apple, IBM and Compaq, which had largely dismissed the idea of selling direct, performed an about turn and declared that they would begin direct selling. Of course, their task (and Dell's) was made immeasurably easier by the advent of the internet and electronic commerce.

There is a definite element of self-publicity about *Direct from Dell*, but then, Michael Dell has much to boast about.

Sean Hallahan

PCW DETAILS

★★★★

Direct from Dell
Authors *Michael Dell, Catherine Freedman*
Publisher *Harper Collins*
ISBN *0002570696*
Price *£19.99*

Harnessing Technology for Career Success – From Online CV to Digital Interview

With technology increasingly being about relating between people rather than machines, it's time to redefine the way we see its traditional usage. Telephone interviews, screentests and digital interviews are all a part of today's challenges when looking for that job. This book provides bare-essential, hard-to-find advice on such endeavours without any unnecessarily confusing details. Helen Vandevelde explores the ways in which technology can be used, and how it has become integral to job-search skills and recruitment strategies.

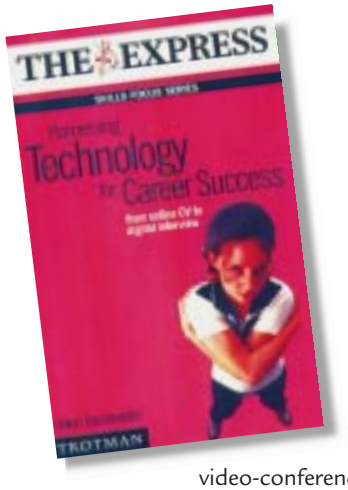
PCW DETAILS

★★★★

HARNESSING TECHNOLOGY FOR CAREER SUCCESS – FROM ON-LINE CV TO DIGITAL INTERVIEW
Author *Helen Vandevelde*
Publisher *Trotman Publishing*
ISBN *0856604615*
Price *£8.99*

Looking at the changes in the value of our skills and the (in)security of a permanent job, Vandevelde considers the new ways in which we are required to sell ourselves to our prospective employers. When it comes to CVs, she stresses how important it is to understand how assessment systems work, and how you must tailor your CV accordingly. As much of this communication now occurs via email, different techniques are required. Additionally, as the structure of an organisation changes, often becoming global in its workforce, the culture of work is altered and is less centred on a permanent base – another reason for getting to grips with email etiquette.

Also covered is, of course, job searching using the internet. You'll find 'expert witness' accounts throughout the book, telling you what to look out for and giving examples of do's and don'ts. For example, the benefits of working for a small company as opposed to a large corporation, what colours to wear for a



video-conference interview, and other considerations that may often be overlooked.

An inclusive book, informative and well structured, *Harnessing Technology* is aimed at virtually anyone who will make up the workforce in 2010, graduates or non-graduates, as according to Vandevelde, by this time 95 per cent of us will be working with technology. Better start reading...

HELEN FORTGANG

Linux in Plain English

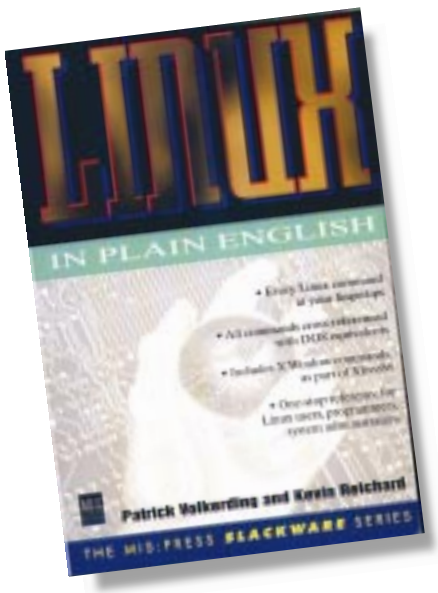
Although *Linux in Plain English* claims to be useful for Linux novices and advanced users alike, in practice, the book's title is misleading, as the newcomer to Linux will find it hard to navigate and even harder to understand. It starts with a brief history of Linux and a basic introduction to the command-line interface, which would give the impression that the novice Linux user is likely to be well-looked after in later chapters. However, the second chapter, from which the book derives its title, is not as useful as one might think.

The authors' concept of using 'Plain English' to point users to the relevant commands involves using two columns, one containing actions,

PCW DETAILS

★★

LINUX IN PLAIN ENGLISH
Authors *Patrick Volkerding, Kevin Reichard, Eric Foster-Johnson*
Publisher *MIS Press*
ISBN *1558285423*
Price *£18.99*



the other containing the relevant Linux commands, which can then be found later in the book. So, if you want to 'mount a disk', you use the command 'mount'. This is all very well if you know why you would want to mount a disk, and how that would help you, but otherwise not very plain at all. A glossary would have been an excellent addition.

Furthermore, every chapter is marked by black tabs on each page that show up on the edge of the book, allowing you to differentiate between chapters. However, the largest section of the book, entitled 'Linux commands organised by Group', is marked as a single chapter, even though it contains eight groups and spans over 500 pages. This makes it a bit of a chore to look up commands you want to reference.

One small but useful section covers direct translations (where available) between all DOS commands and their Linux equivalents, a very handy reference for DOS users. However, another small section that lists all common Linux commands is a complete waste of space, as it simply comprises an alphabetical list of commands linked to the relevant group in the massive 500-page chapter, which provides little help in locating an explanation.

BARRY DE LA ROSA

The advent of digital cinema projection, aka eCinema, looks set to close the curtain on celluloid.

The digital menace

One century at the movies has seen the advent of sound, colour and multi-channel digital surround, but the core technology of shining light through film has remained essentially unchanged. But in an ironic twist, public cinemas are about to embrace a technology used in those very home theatres which try so hard to emulate the big-screen experience. Cinema projection is about to go digital, which could spell curtains for celluloid.

As ever, the driving force is not the push for superior quality, but a financial saving for the studios, and it's not hard to see why they're excited. A feature film resides on huge 1.5m diameter reels – weighing as much as 30kg each and costing over £1,000 to duplicate. If you consider that a major movie requires up to 5,000 prints to satisfy US cinemas alone, you've got an expensive duplication and distribution job on your hands. To make matters worse, film prints quickly become plagued by dirt and scratches.

Digital, or eCinema, however, could mean electronic movie distribution using satellites – eliminating duplication and vehicular transport costs, as well as greatly reducing physical storage requirements. Each showing would look the same, without image deterioration. Cinemas could also show live sporting or concert events, or juggle which movies are shown right up to the last minute according to demand. The only hurdle has been the development of a digital projector to match the quality of 35mm film.

The SMPTE (Society of Motion Picture and Television Engineers) publishes guidelines for cinema print projection and is currently developing guidelines for eCinema, but this hasn't stopped Hughes-JVC and Texas Instruments (TI) from building and demonstrating their own systems.

TI is, unsurprisingly, advocating its Digital Light Processing (DLP) and Digital Micromirror Device (DMD) technologies, which use a device not unlike a disco mirror ball to reflect light onto the screen using an array of tiny mirrors. TI's proposed DLP cinema projector boasts 13,000 lumens, better than 800:1 contrast ratio, and a squarish resolution of 1,280 x 1,024 pixels, which can be stretched to widescreen using 1.5x and 1.9x anamorphic lenses, just like today's film systems. In fact TI's DMD 1210 chip measures within one millimetre of a frame from an anamorphic release print.

Courtesy of Lucas films and 20th Century Fox

▲THE PHANTOM MENACE HAS ALREADY AIRED IN DIGITAL FORMAT IN SOME US THEATRES

Hughes-JVC favours its Image Light Amplifier (ILA) system, which employs a crystal light valve and a somewhat conventional CRT. Its ILA-12K projector boasts over 12,000 lumens light output, contrast exceeding 1,000:1 and a wide aspect resolution of 2,000 x 1,280 pixels.

But who's making digital films? Until digital cameras are employed when making movies, studios have to digitise existing film in Telecine suites. Always an adopter of new technology, George Lucas has digitised his already heavily computer-generated *Star Wars* prequel, *The Phantom Menace*, for digital trials in selected theatres. On the 18th June it previewed in four cinemas on the east and west coasts of the United States, using both Hughes-JVC and TI technologies. Lucas also plans to shoot the next two *Star Wars* prequels entirely digitally.

Hughes-JVC appears to be winning the race, at least in terms of publicity. CineComm has announced an end-to-end digital cinema solution employing the ILA projector and QualComm's compression and encryption algorithms. It's already been seen as far afield as Rio de Janeiro, and rumour has it that the Odeon Leicester Square is fitting one, too.

However, questions still remain. Is the quality as good as film, particularly on the larger first-run screens? Who'll pay the £100,000 plus for the projectors? With the savings on offer, Hollywood is unlikely to care about quality, and may subsidise or even foot the whole bill. We may soon never see another film at the cinema.

GORDON LAING

The thumbnail-sized microdisplay is the latest exciting development in monitor technology.

Seeing is believing

After much anticipation, the microdisplay – those tiny displays, sometimes called miniature flatpanels – are moving from labs into real-world products. What makes microdisplays so exciting is their huge potential.

Microdisplays present product designers with a chance to increase the displayed image size and resolution, yet physically shrink the display device itself. Their physically-smaller size means products will be less bulky and heavy, and will run longer on the same battery. They will be used mostly in mobile phones, headgear, cameras and pagers. David Mently, a vice-president at Standford Resources, one of the industry's flatpanel display research companies, said there are also opportunities for microdisplays in 'rear-projection monitors for desktop and HDTV monitors and ultracompact, very-high-resolution front projectors.'

According to research from Microdisplay Report, liquid-crystal-on-silicon (LCOS) microdisplays are perhaps the hottest emerging display category. More than a dozen companies will soon offer LCOS displays in high-volume quantities. The next six to nine months will be critical for this industry. 'Competition will be fierce, and manufacturing issues are not yet ironed out,' said Chris Chinnock, editor of the Microdisplay Report.

Included in the competition is a new Hewlett-Packard partnership with Displaytech. The two companies will jointly design, make and sell the company's 'reflective microdisplay' components for consumer electronic products.

According to HP, the microdisplays, which are smaller than a fingernail, pack the imaging capability of a television or computer monitor onto a silicon chip and can be combined with an illumination source and/or optics. The high-volume component products will be sold under the combined HP and Displaytech brands.

Displaytech's microdisplay technology, called LightCaster, actually generates an image on the surface of a thumbnail-sized microchip. A tiny, LCD-like panel on the silicon face packs high-resolution imagery and colour into a 10.4mm diagonal image. Display manufacturers can then use a variety of optical techniques to enlarge this fingernail-sized, crisp image. The company said the technology might find a home in full-sized, high-definition TV, or a handheld computer screen that might be seen through a viewing lens. In either case, the result is a sharp, 1,024 x 768 pixel image with 16.7 million colours.

The partnership initially will focus on selling the components to TV and projection display manufacturers, then move to PDA markets. And further down the road, the technology might find a home in wearable computing devices such as head-mounted computer displays. Headset maker, Virtual Vision, recently announced the eGlass, a 4-ounce headset with a 1in^3 monitor that creates a full-colour, full-motion virtual image of between 16in in diagonal at a distance of 2ft, and 60in at 6.6ft. It incorporates a reflective LCOS display from Colorado MicroDisplay. The eGlass will target low-volume industrial and medical markets.

A Massachusetts-based company, MicroOptical, plans to produce portable displays that attach to ordinary eyeglass or safety glasses. The company's Integrated Eyeglass Display includes a concealed electronic display. When the user wears the glasses and turns the display on, an image of a video or computer screen appears at a distance of several feet. A focus adjustment allows the user to place the image at a comfortable distance.

'The glasses provide the user with a convenient, portable means of carrying a display that may be connected to a notebook computer, wearable computer or other electronic device,' said Tom Holzel, vice-president of sales and marketing at MicroOptical. Applications that seem particularly relevant, Holzel said, include hands-free reading of instrumentation by technicians and telephone linemen, as well as infantry infra-red night-vision use in conventional military eyewear such as goggles and gas masks. In addition, various medical uses such as anesthesiologists and surgeons watching their patients, are also prevalent.

BARBARA GENGLER

PERSONAL COMPUTER WORLD BUYERS CHARTER

MAIL ORDER PROTECTION SCHEME (MOPS)

When you order goods as a *private* individual reader from a UK supplier's advertisement in *Personal Computer World* and pay by post in advance of delivery to that Mail Order Advertiser, which subsequently ceases to trade and goes into Liquidation or Bankruptcy prior to delivery of such goods, you may, under the 'Buyers Charter', qualify for compensation, providing:

1. You have not received the goods or had your money returned.
2. You have followed the *Personal Computer World* guidelines when placing your order (see over).
3. You have taken all reasonable steps to effect delivery or refund.
4. You have retained irrefutable proof of purchase, for verification purposes:

a) A copy of the original advertisement from which the goods were ordered.
b) Comprehensive proof of payment.

GUIDELINES

Claims must be submitted so as to arrive 'NOT EARLIER THAN TWENTY-EIGHT DAYS AND NOT LATER THAN THREE MONTHS' from the official on-sale date of the magazine. Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated. *Claims received outside this period will not qualify for consideration for compensation under the 'Buyers Charter'.*

Once a supplier who has advertised in this magazine has become subject to either Liquidation or Bankruptcy proceedings and upon completion of all winding-up procedures, *Personal Computer World* guarantees to expeditiously process those *private* individual readers' claims made and submitted, in accordance with those procedures outlined, up to the following limits.

a) £2,000 in respect of any claim submitted by one Private Individual Reader.
b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publisher's maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the Publisher's discretion.

As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the 'Buyers Charter' will be subject to re-processing and will take into account any shortfall which may then exist. Payments under the scheme will also take into consideration the obligations and liabilities of other interested parties, such as credit card and/or insurance organisations etc.

EXCEPTIONS

This guarantee only applies to advance postal payments made by *private individuals in direct response for goods itemised/illustrated in display advertisements*. It does not cover goods ordered from advertising Inserts or Cards, classified advertisements or MicroMart, or Catalogues obtained from, or supplied by, any advertiser regardless. *Similarly, protection does not exist in relation to purchases made as a result of reviews and/or editorial comment*.

The 'Buyers Charter' is designed to safeguard the *PRIVATE individual reader*. It does not provide protection to any companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. Neither is cover provided for orders placed from, or to, any overseas suppliers or for goods purchased for resale.

CAVEAT EMPTOR

Readers are reminded that the Mail Order Protection Scheme was solely implemented to provide protection to the private individual when goods are ordered 'Off the Page' and paid for by post. *It was not designed for, nor will it offer any protection, in the event whereby goods are purchased via the Internet*.

CREDIT CARD PROTECTION

Always pay by credit card when ordering goods valued in excess of £100, thereby ensuring maximum protection in the event that an advertiser ceases to trade prior to such goods actually being received.

DISCLAIMERS

Readers are reminded that the opinions expressed, and the results published in connection with reviews and/or laboratory test reports carried out on computing systems and/or related items, are confined to, and are representative of, only those goods as supplied *and should not be construed as a recommendation to purchase*. Whilst every precaution is taken to ensure that reliability and good business practices prevail, the Publisher cannot be held responsible for the overall trading activities of any supplier referred to, or advertising within, this publication.

HELPING HAND

Each month ***Anthony George****, our* ***customer services manager****, will give advice on what to watch out for when buying computer equipment off-the-page.*

Consumer credit agreements, including the issuing of a credit card and interest free credit in a shop, often affect PC buyers. But what should you look out for?

Credit and hire businesses are regulated under the *Consumer Credit Act 1974*. Sources of credit, from banks to mail-order companies, must be licensed every five years by the director general of Fair Trading, and listed on the consumer credit register.

The register is open to public view and basic information contained in it can be obtained free of charge. By paying a fee, you can also find out which licences or applications the director general is considering revoking or refusing. Most consumer credit agreements, where the amount of credit does not exceed £15,000, are regulated by the Act. Prospective borrowers must be given written information allowing them to make informed choices, and although such agreements are offered and administered by the lender or supplier, they are designed to protect the borrower.

What an agreement must tell you

The agreement document must specify clearly in writing the terms for the repayment of the credit, which are then fixed for the period over which you repay. They must include: the total amount borrowed, credit limit, the total cost to the borrower including interest and any other additional charges, the true yearly rate of interest (APR), at which stage you may cancel the agreement, clearly show your rights and duties as a borrower, the lender's name and address, the number of monthly repayments and first repayment date, details of the goods/services provided, together with the cash price, a note of any deposit paid, and any special terms that the law does not consider to be 'implied terms' of the contract. For example, the fact that any goods supplied under the agreement must be of satisfactory quality is an implied term of the contract, but the fact that goods may be supplied by instalments is not.

The document must state that the borrower has rights under the *Consumer Credit Act*, and explain what right the borrower has to cancel the agreement. It must also give details of the lender's rights, including a summary of how the lender will treat late payment, early repayment and default. If any of this information is missing, the lender cannot enforce the agreement unless and until a court order is obtained.

Anthony George, Customer Relations Department, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG

order form

PERSONAL COMPUTER WORLD

Use this form when you order by phone, fax or post.

SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY: ❑ TELEPHONE ❑ FAX ❑ POST

ORDER REFERENCE NUMBER (IF QUOTED) .....

DESPATCH REFERENCE NUMBER .....

ADVERT APPEARED IN PCW:

ISSUE DATE ..... **PAGE** .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

❑ C.O.D ❑ DEBIT CARD ❑ OTHER (SPECIFY) .....

CARD COMPANY .....

ISSUE NUMBER (debit cards only) .....

START DATE ..... / ..... / ..... EXPIRY DATE ..... / ..... / .....

CARD NUMBER ..... / ..... / ..... / .....

SUB-TOTAL _____

DISCOUNT _____

CARRIAGE _____

SURCHARGES _____

VAT _____

TOTAL _____

SIGNED .....

DATE ...../...../.....

DAYTIME TELEPHONE NUMBER .....

DELIVERY ADDRESS .....

.....

..... **POSTCODE** .....

AGREED DELIVERY DATE ..... / ..... / .....

Purchasing Guidelines

There are several steps you can take to help ensure that the buying process is smooth and trouble free. We'd like to suggest these main guidelines:

● KEEP RECORDS

When you phone a supplier, make a note of the name of the person you speak to, and when. Note down any claims they make for the product in which you are interested, or any specifications they mention. If you are unsure that what they are offering is right for the task, then ask.

● GET A FULL SPEC OF THE MACHINE

Before you place an order for a machine, insist on being faxed or emailed a full specification, detailing all components and peripherals. Check what is included: for example, when buying a printer, are all cables and cartridges bundled in? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

● BE CLEAR ABOUT SUPPORT AND WARRANTIES

Make sure that you get a warranty which suits your needs and is fully detailed in the quotation. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand the level of service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

● USE CREDIT CARD PROTECTION

When you place your order, use a credit card. The Consumer Credit Act ensures that credit card purchases between £100 and £30,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the Internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

● SET DELIVERY DATE AND CHECK WHAT'S DELIVERED

This gives you some comeback if the goods are not delivered on time. When the goods arrive, check the packaging before you sign for them, to guard against damage in transit.

Directory of Product Suppliers

SEE THE MICROMART PRODUCT LOCATOR ON PAGE 505

Directory of Product Suppliers

SEE THE MICROMART PRODUCT LOCATOR ON PAGE505

Directory of Product Suppliers

SEE THE MICROMART PRODUCT LOCATOR ON PAGE 505

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Index for Direct Buyers' World

The place in *PCW* where you can compare prices on a wide range of hardware and software. The card insert at page 276 marks the start of the section.

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Faxback Table

PCs and Notebooks	Issue	Pages	Code
Pentium III PCs	April-99	5	2009
400MHz Celeron PCs group test	May-99	11	2010
PII *vs* PIII PCs	June-99	13	2011
K6-III PCs	July-99	11	2012
Budget PCs	September-99	11	2013
Notebooks	September-99	8	2014
Pentium III 550MHz PCs	August-99	11	2015
Hardware Group Tests	**Issue**	**Pages**	**Code**
Budget flatbed scanners	September-98	9	2107
Digital video	January-99	13	2111
Laser printers	February-99	12	2112
Colour inkjets	February-99	8	2113
Monitors (17in, 19in and flatpanels)	April-99	11	2115
Digital cameras	May-99	9	2116
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3D graphics cards	June-99	6	2119
PDAs and handhelds	July-99	10	2120
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PCW Faxback number: 09065 600632

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Software Group Tests	Issue	Pages	Code
Accounting and personal finance	June-98	11	2205
Utilities	September-98	8	2208
Speech recognition	October-98	5	2209
Databases	November-98	10	2211
Communications	December-98	10	2212
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Image editing (high end)	February-99	8	2214
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Java and visual programming tools	April-99	8	2216
Desktop publishing	June-99	8	2217
Operating systems	July-99	12	2218
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Website construction part 3	June-99	3	2322
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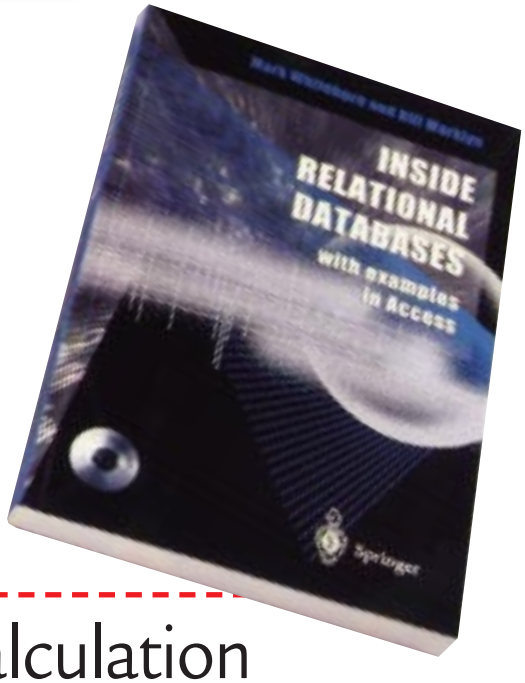
Ecommerce for small business	October-98	5	2403
Building your own web server	November-98	6	2404
Hubs and network starter kits	February-99	4	2407
Firewalls and net protection	March-99	3	2408
IT training for your small business	April-99	4	2409
Backup solutions for your small business	May-99	4	2410
Encryption for ecommerce	June-99	3	2411
Building a five-user network	September-99	5	2412
General Features	**Issue**	**Pages**	**Code**
PCW Service & Reliability Survey	October-98	12	2513
Office 2000	June-99	5	2519
Anti-virus	August-99	5	2521
Memory	August-99	2	2522

PCW Faxback number: 09065 600632

Inside Relational Databases



(reviewed in PCW November 97, p329)

- Written by Mark Whitehorn, who writes *PCW's Hands On Databases* column.
- Explains all you need to know to create efficient relational databases.
- Avoids the usual database jargon.
- Includes masses of examples using Microsoft Access.
- Source code for all examples is on the accompanying CD.
- Reader offer price is just £14.50 — a saving of £5 on the RRP of £19.50.

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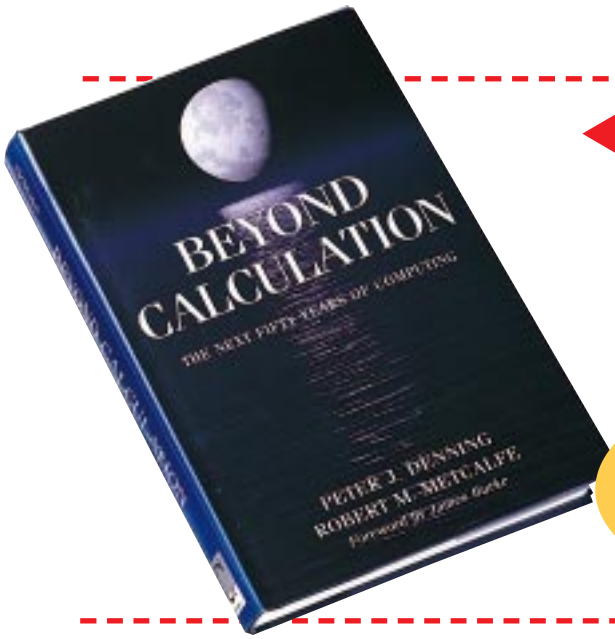

Beyond Calculation

- World-recognised experts predict the future of computing in this ground-breaking book.

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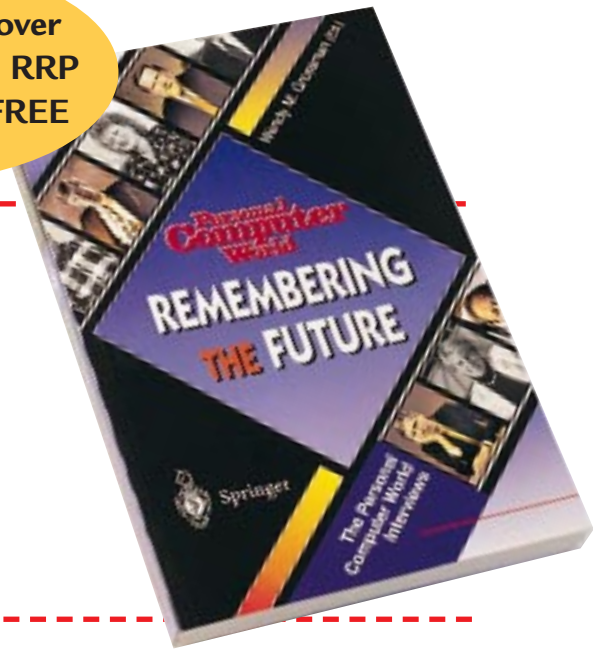
All books have over 30% discount on RRP and postage is FREE

Remembering the Future



- Collected interviews from *Personal Computer World*, including Bill Gates, Michael Dell of Dell Computers and Intel's Andy Grove.
- Reader offer price £9.95 — over 30% off the RRP of £14.95.

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Quickie

One transport lorry overtakes another on the motorway, taking twice as long to pass it as it would have done had the two lorries been travelling in opposite directions. How many times faster than the second lorry is the first lorry travelling?

This Month's Prize Puzzle

To choose the winners for Prize Puzzles where there is more than one correct solution (usually every month) I use a random number generator which will come up with a random number between any limits that I give it.

If I use it to generate an integer in the range one to 100 million inclusive, what is the probability that the number produced will have a digital sum of exactly 49 – ie a number whose digits add up to 49?

Exact answers only please, on a postcard or the back of a sealed envelope, to: PCW Prize Puzzle – October 1999, PO Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive not later than 20th October 1999.

We will also accept solutions by email. Send the solution and your name and address only (no explanatory notes or program listings, etc) to: jj.clessa@btinternet.com

Winner of July 1999 Prize Puzzle

A fairly easy puzzle that could be solved (and was, by most entrants) by analytical methods. The size of the entry bag – almost 160 – showed how simple it actually was. The winning entry came from Mr Richard Jones of Reigate, Surrey. The answer was that one lady bought 13, the other lady bought four. However, there was no way to find out which lady bought what. Congratulations, Richard, your prize is winging its way to you.

May the answer be with you

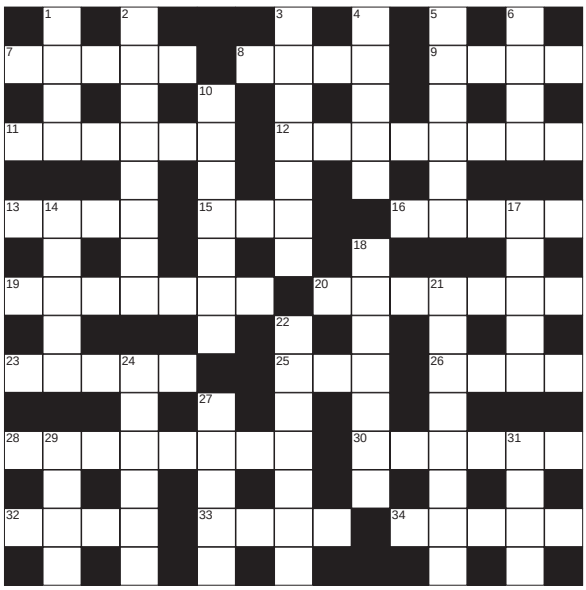
Remember the May puzzle, the one about English, Science and Maths books? Several of our readers have informed me that they could not understand how the solution was obtained. Unfortunately, I am unable to publish the solution here for reasons of space, but if anyone would like to have it, I will send it to them, either by sae or by email, if they contact me.

- *If you send an email entry, remember to include an address to where the prize can be sent should you be a winner.*

- *By the way, have you applied for the latest Clessa Quickie books at the reduced price of £2.25 each? Quite a few of you have already. For further information, you can write or email me at the puzzle entry address, or you can visit the new JJ Clessa website at http://dspace.dial.pipex.com/jj.clessa. It contains, among other things, answers to earlier Quickies, a difficult puzzle (but not the PCW kind, ie the kind that can be solved by whirring computers), hopefully a few readers' comments, a bit of this and that – and, of course, a plug for the latest Clessa Quickie books!*

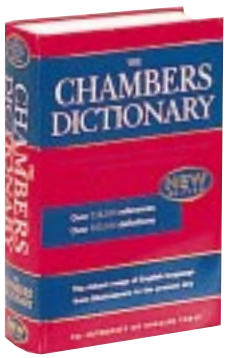
JJ CLESSA

prize crossword



ACROSS
7 Free version of Unix (5)
8 Part of a 34 across (4)
9 See 30 across
11 Division of a disk (6)
12 Microsoft's Internet software (8)
13 Advanced Internet programming language (4)
15 Software glitch (3)
16 Time to reboot (5)
19 Visuals input device (7)
20 Existing setting unless another has been stated (7)
23 Screen dot (5)
25 19 across's text capability (inits) (3)
26 Electronic input/output point (4)
28 Rival of 12 across's company (8)
30 and 9 across Peripherals plug-in point (6, 4)
32 Shock____ allows for fun Internet action (4)
33 Access point for inserting disks (4)
34 Grid-like visual (5)

DOWN
1 Citrus fruit (4)
2 Four-line poem (8)
3 Retaliation (7)
4 Gradient (5)
5 Outcry (6)
6 French cheese (4)
10 Boy singers (7)
14 Character code (abbrev) (5)
17 Divide (5)
18 Sadden (7)
21 North African (8)
22 One way or another (7)
24 Spring festival (6)
27 Error (5)
29 Test (4)
31 Competently (4)



Each month, one lucky *PCW* Crossword entrant wins a copy of the new *Chambers Dictionary*.
The winner of August's puzzle is: Mr D W Wyeth, of Bodicote, Oxon.
This time, it could be you. Send your completed crossword to: 'PCW September - Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 31st August, 1999.
• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Solutions to August's crossword

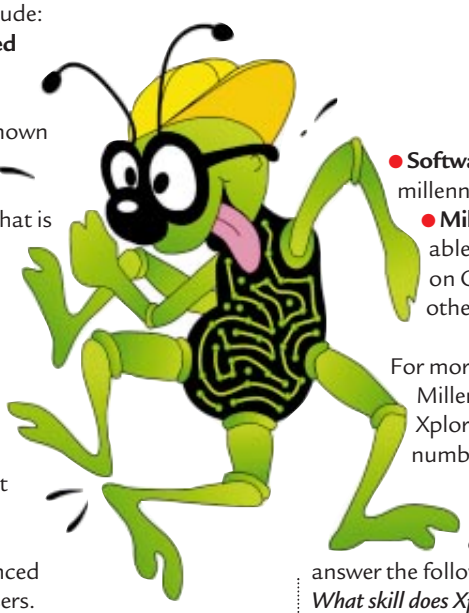
ACROSS
7 Internet 9 Analog 10 Disk 11 Character 12 Buses 14 Scanner 18 Start Up 19 Lithium 22 Refresh 24 Email 26 Intranets 28 Tray 29 Laptop 30 Provider
DOWN
1 Antiquity 2 Seek 3 Knock 4 Gala 5 Battle 6 Soar 8 Trance 13 Ear 15 Nail 16 Agar 17 Mutilated 20 Hum 21 Asleep 23 Estate 25 Ascot 26 Iraq 27 Amps 28 Tail

Win Millennium BugBuster

Xplorys is giving 30 *PCW* readers the opportunity to win a copy of its Millennium BugBuster, worth £34.99 each. Millennium BugBuster, a software program that fixes hardware date mechanisms to be compliant for use in and after the year 2000, is a tailored version of an existing software engine that is currently in use by large multinationals, banks and governments. The software has been altered to perform on a professional but simple level for the average PC user. The BugBuster simply scans all hardware date mechanisms of the PC on BIOS/CMOS/Operating System levels, tests for leap year problems and determines buffered and unbuffered RTC. Whenever the test results of these scans show a failure on year 2000 compliance, the Millennium BugBuster will fix these hardware problems – without you having to do anything.

Features include:

- **Guaranteed hardware compliance** against all known millennium problems.
- **Software** that is completely accessible in English, Dutch, German and French.
- **User-friendly** software that can be easily installed by non-experienced computer users.
- **Ability to test** an unlimited number of PCs for year 2000 compliance.



- **Software advisor** and a millennium countdown clock
- **Millennium BugBuster** is able to fix the PC hardware on CMOS level, a skill most other products do not have.

For more information on the Millennium Bug Buster from Xplorys, call the free phone number on 0800 634 4242.

☛**To enter this competition,** simply answer the following question:
What skill does Xplorys' Millennium BugBuster have, that most other year 2000 products do not?

Win 3D glasses / Graphics card

This month we are giving five *PCW* readers the chance to win ELSA 3D Glasses and Graphics Card Bundles, worth £179.99 each.

ELSA, a German graphics card vendor has combined its 3D Revelator Glasses with the RIVA TNT-based ERAZOR II, to create a product that gives PC gamers an absorbing 3D experience on a normal PC screen.

The 3D glasses connect to the ERAZOR II card and create the 3D effect by alternatively blanking out one lens after the other, 125 times per second. Each eye sees a slightly offset image, which combines to form a near virtual reality 3D impression for the gamer. This prize is an absolute 'must have' for anyone who is into PC gaming.

To give the buyer something to get their teeth into, the bundle also contains free gaming software in the shape of Need for Speed III, Recoil, and 3D Games samplers.

For more information on Elza's 3D glasses and Graphics Card Bundle, please call 0118 965 7755 or visit www.elsa.com.

☛**To enter this competition** just answer the following question:
How many times a second is one lens blanked out after the other?

a) 133
b) 555
c) 125

How to enter the competitions

Write your name, address and daytime telephone number on a postcard or the back of a sealed envelope. Mark your card(s) '*PCW*/Xplorys Competition' or '*PCW*/Elsa Competition' and send to the following address by Friday 30th September 1999:

Personal Computer World
Building 960
Sittingbourne Research Centre
Sittingbourne
Kent ME9 8AG

◆ *Competitions open to residents of the UK only.*

Rules of entry

These competitions are open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Xplorys and ELSA. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

Flashback

To kick off this new section we take a trip back in time to unearth the burning issues that previous PCW journalists tackled. Compiled by Matthew Howard.

20 YEARS AGO October 1979

It was a very exciting time for the young *PCW* (just over a year old), as the first Japanese PC had arrived in the UK. The article *'Japan Muscles into Micros'* featured the newly released Sharp MZ-80K, aimed at the Commodore PET market. The big question of the day was: 'Could the Japanese make up the year and a half lead of their competitors?' Looking back, perhaps that should have been: 'How little time will it take for the Japanese to challenge the market leaders?'

One of the first programmable calculators was reviewed by Dick Pountain, who was amazed that it could fit inside his pocket. He was highly enthusiastic about the 'good-looking' CASIO FX501P and predicted it would eat up the market for calculators below the 'almost a micro' class. Today, you can buy a scientific calculator with small change but in 1979 the FX501P set you back a hefty £84.95.

In a section called *'On the Line'*, consultant David Hepditch discussed the practical technicalities of Marshall McLuhan's concept of the 'Global Village'. McLuhan realised how the increasingly widespread use of personal computers in the home and office, supported by advances in telecommunications, made for some exciting possibilities. It was a prescient forecasting of the adoption of the Web. ■

15 YEARS AGO October 1984

The Commodore Plus/4 was benchtested with the magazine headliner *'Field Goal or Fumble?'* below a burly US football player. The compact-sized Plus/4 was deemed a potential hit with home users and small businesses – a worthy successor to the Commodore 64 and a decent rival to Sinclair's QL. With built-in applications running under BASIC 3.5, the Plus/4 was a snip at under £250.

In an article headed *'Mind Over Matter'*, *PCW* compared artificial intelligence to the human brain. Research was under way to build a computer to mimic the awesome processing structure of the human brain and *PCW* revealed there were strong similarities between recent innovations in computer technology and the way the brain works. Among the major features of the human-like AI system was the full compatibility within its structure of a program's subserving functions, such as attention, memory, learning and concept formation.

Also new on the market was the Apricot F1, an inexpensive colour business micro 'with tons of bundled software' at £1,300. The Intel 8086-based machine (clocked at 4.77MHz!) was targeted to replace jaded Apples, PETs and Sanyos, and it boasted 256K of RAM and 32K ROM. The reviewer worried that its Sony 3.5in disk drive might overheat, and its unconventional mouse might better be termed a rat. ■

10 YEARS AGO October 1989

'Apple's portable Macintosh has arrived!' was the news 10 years ago this month. After two years of rumours, *PCW* had secured a world exclusive with a Macintosh Portable benchtest. It boasted a 16MHz Motorola 68000 processor, 1Mb of RAM, an 'impressive' monochrome yellow-tinted screen, a lead acid battery, and a trackball – it weighed in at only 6.8kg. All for just £4,500!

In the dark old days of Windows/286 and Windows/386, *PCW* put HDC's new Windows Manager suite through its paces, and found 'little to criticise – and little competition'. It concluded: 'HDC's product is a vast improvement over native Windows' and 'adds an attractiveness missing from the OS'.

PCW also checked out the Badger 386 accelerator board that let you run a 386 computer (maximum 16MHz) at the top speed of a much more expensive 486 (maximum 33MHz). It was considered a good buy at £1,295. But hold on, Stop Press! Suddenly, Badger's manufacturers TBI announced a Badger board with a 486 daughter-board. Quick someone, add a box-out!

A timely article outlined how the Soviet Union was tackling the PC revolution by writing Russian versions of popular software packages. At that time the Soviet Union was thought to be 'catastrophically lagging behind the West' in the field of computer technology – for economic and political reasons. Our article came just before the fall of the Communists and leaves one wondering how much the West's widespread adoption of PCs was the straw that broke the back of the Russian political system. ■

5 YEARS AGO October 1994

The era of Group Tests was now all the rage. We featured 15 Budget Lasers from under £400 where a price war was developing. Of the 15 models tested the cheapest was the Mannesmann Tally T9104W at £325. Highly recommended were the HP LaserJet 4L at £462 and the NEC Silent Writer Super Script 610 at £350.

Terence Green took the wraps off Windows NT 3.5. Code-named 'Daytona', it added several features to make Windows NT a better multi-tasking network citizen in workgroups.

We also interviewed industry heavyweight Philippe Kahn, founder of Borland. There was a time when Borland was one of the big software companies alongside the likes of Microsoft and Lotus. 'Upsizing' was high on Kahn's agenda – building a company's software infrastructure around the currently installed base. Five years later, with Kahn having gone through his slimmed-down Starfish phase – the glory days are but a dim and distant memory.

Perhaps most surprising of all was *PCW's* slavering anticipation for the Intel 90MHz and 100MHz Pentiums, set to run rings around the first PowerPC chips and completely outclass anything AMD or Cyrix had to offer. Our recently tested 550MHz Pentium IIIs emphasise how rapidly Intel has advanced the power at the core of the PC market. ■

The Internet continues to offer PC users a range of useful not-for-profit information sites and research projects. *PCW* continues its coverage dedicated to spreading the news on these non-commercial good works. If you have details of any such sites, please send information to readerweb@vnu.co.uk

RESOURCE

Action 2000

http://www.bug2000.co.uk/

The millennium bug is set to bite in less than three months' time and this top-notch site, sponsored by the UK Government, offers free advice on how it might affect you. No matter what level of technical expertise you have, it's easy to find lots of information on how to check out your own PC.

At http://domestic.bug2000.co.uk/index4.shtml, for example, home computer users can find information on how to test their equipment, and advice on what to do without calling in the experts. For small business users, as well as home users, the Software Status Database at <http://business.bug2000.co.uk/get_help/software_index.shtml> is also a must.

The Spy who Watched me

http://www.spy.org.uk/

This is a not-for-profit UK website, devoted to turning the cameras back on those who use them to watch us. While the widespread use of CCTV and webcams has been useful in tackling some crimes, the site argues that these technologies are increasingly used by powerful vested interests to monitor all of us and record everything we do, in order to control us.

The site asks the question: is everything recorded on CCTV what it seems? There's also a section on how much information we give away when we visit a website. We rate this a big fat 'P' for Paranoia. That doesn't mean they're not out to get you, though!

SITE FOCUS

A House without Windows?

http://zork.net/refund

The Microsoft Refund Newsletter site is a cornucopia of riches, put together by Linux-lovers obsessed with the Windows licensing policy. These are people who regard Microsoft in terms approaching fanatical zealotry, and their vision is single-minded, focused and based on pure hatred. Therefore, it's utterly fascinating.

There are links to some long-winded, scrupulous accounts of the attempts of early campaigners who fought with Microsoft OEMs (the hardware manufacturers which assemble PCs) to buy a machine without the operating system. Meeting with a wall of obstruction and half-hearted 'Sorry, it can't be done!' arguments meant that these conscientious objectors just got madder and madder and more determined to win the point of principle. 'Why should I be forced to buy something I don't intend to use?' asks Donna, and it's hard not to sympathise with her struggle.

The 'Refundees' are now arguing that it's best to take up your case directly with Microsoft, rather than its OEMs. Don't click the YES button when you first switch on the machine, they advise; instead, boot up from pre-prepared floppies and then apply to Microsoft for a refund.

Amid all this blinkered prejudice, you start to wonder how bad Microsoft really is. For many people who have bought PCs, the company's operating system and the standards that have been created around Windows have enabled a great deal of productivity, communication and fun. The Refund Newsletter site, however, is a resource for the few who care to dissent from that view – the anti-Gates rebels who have always belived the Mac was better, that Unix was stability personified and that Linux will one day rule the Internet. Take your pick.

PROJECT

The Power of Images

http://www.cast.org/strategies/image_barrier.html#Power

CAST is an educational, not-for-profit organisation that aims to make the most of technology as a way of expanding opportunities for those with disabilities.

However, new technology can not only liberate the disabled, it can also work against them. One of the projects that CAST is promoting aims to help the visually impaired get more out of the Web. CAST is asking sympathisers building Web pages to make their use of images more friendly to those who are visually impaired.

Images are hugely powerful and increasingly central to all our major communication and entertainment mediums. However, if websites use visual elements that have no identifiers, they can become meaningless to many surfers. The project suggests that judicious use of ALT tags and D-Links can be a major way of helping Web designers make their sites more accessible.

Search the Stars

http://www.setiathome.ssl.berkleyedu/

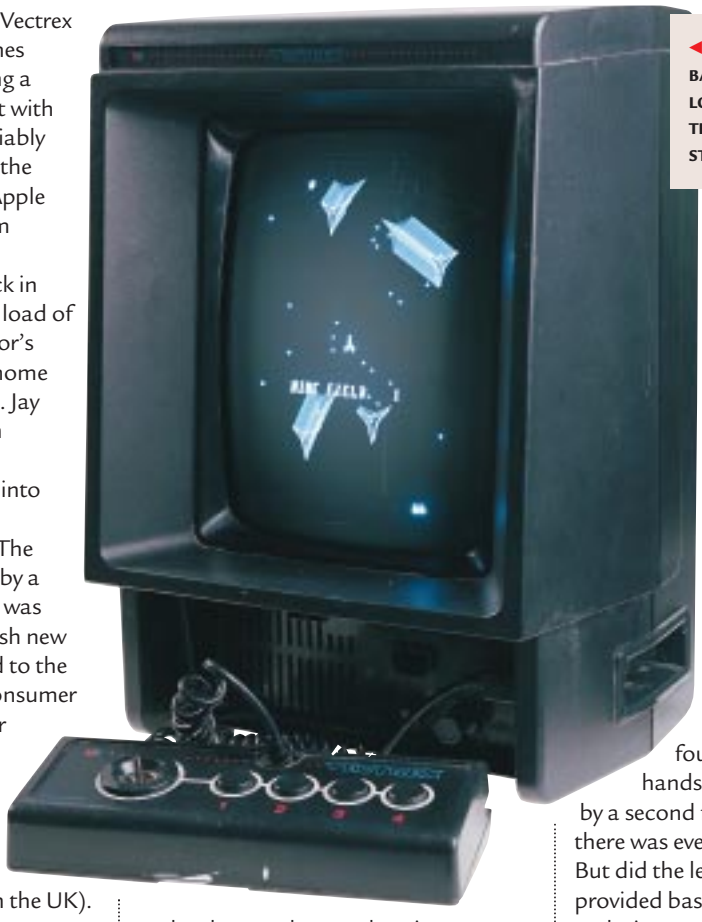
Yes, the search for extra-terrestrial intelligent life is gathering pace with this project to analyse radio signals from across the universe. All you need do is download a piece of software from this US university site and then use the idle processing time, when your PC normally simply displays a screensaver, to 'analyse' lengthy periods of radio signals to see if any pattern emerges that might represent intelligent communication aimed at Earth. At the very least, seti@home is becoming the coolest screensaver to use.

MB Vectrex

As the console that brought the arcade into the living room, the MB Vectrex still has devotees.

Back in the early 80s, the Vectrex broke the mould of games consoles by not requiring a TV set. A standalone black unit with built-in monitor, it could justifiably be described in appearance as the anti-Macintosh – except that Apple was at least one year away from launching its all-in-one.

The Vectrex story starts back in early 1981, as a project to fit a load of small CRTs found in a liquidator's surplus store into a table-top home console called the mini-arcade. Jay Smith and his team at Western Electronics/Smith Engineering developed the concept further into a product licensed by General Consumer Electronics (GCE). The original 5in tube was replaced by a 9in model and an upright case was designed. Complete with a swish new name, the Vectrex was unveiled to the public at the Summer 1982 Consumer Electronics Show and was later available in the US for $199. In spring 1983, GCE was acquired by board games giant Milton Bradley (MB), which later distributed the Vectrex across Europe (£150 in the UK).



◄ **MB Vectrex: its loyal band of followers were in love with its vector-based technology and coin -op standards of gaming**

The Vectrex was unique, not only for its built-in portrait aspect 9x11in monitor, but because it employed vector display technology. Similar to the tubes used in early oscilloscopes, the display could draw perfectly straight bright lines which didn't suffer from the stepped pixel appearance of raster-based systems. It was, in fact, the same technology used by the coin-op arcade classics Asteroids, Tempest and Star Wars. Like Asteroids, the Vectrex display was mono, so its game designers supplied clip-on coloured acetate overlays, delivering an effect not dissimilar to the original Space Invaders coin-op.

Atari may have owned the Asteroids brand and written a half-decent version for its VCS console, but it was down to GCE to produce the definitive home clone. Thanks to the same unique display technology as the arcade coin-op, Vectrex Minestorm remains the most authentic home version of Asteroids today. Minestorm was actually built into the machine, although a bug that prevented early copies from progressing beyond Wave 13 was the driving force behind the Minestorm II cartridge.

The Vectrex started as a project to fit a load of small CRTs into a table-top home console

The vector-based Tempest arcade coin-op was flipped back to front and converted into the Vectrex classic Bedlam. Scramble and Berserk were licensed into highly playable conversions. The original Spike game (despite inspiration from Donkey Kong) even featured basic speech synthesis: 'Eek, help Spike!' and 'Oh no, Molly!' stunned many impressionable teenagers. Minestorm aside, the greatest Vectrex game borrowed the best bits of the Tempest and Star Wars coin-ops, resulting in the amazing 3D WebWarp.

Powering the Vectrex was a 1.6MHz version of the Motorola 6809, called the 68A09, backed up by General Instruments' AY-3-8192 3-tone generator sound chip. Common subroutines and instructions were stored in an 8K x 8-bit 2363 ROM, while a pair of 1K x 4-bit 2114 static RAMs supplied storage during gameplay. Most games cartridges measured 4K, apart from a few rarities which included Spike at 8K.

The standard four-button analogue joystick handset could be complemented by a second for two-player games, and there was even a commercial light pen. But did the legendary 3D glasses, which provided basic colour support, ever make it out of the trade shows? Like ColecoVision's Adam, Vectrex even had a computer keyboard add-on – well, a good rumour of one anyway.

Sadly, in 1984, the Vectrex was discontinued as home computers took over. Its story doesn't end quite there though. In 1988, Western Technologies and Smith Engineering were rumoured to attempt a handheld Vectrex resurrection using the Sinclair pocket flat TV; Nintendo's Gameboy in 1989 scuppered that plan.

Like most classic consoles, however, the Vectrex lives on over the Internet. There's an excellent PC emulator and even development of new games, led primarily by John Dondzila with his Vector Vaders, a long overdue Space Invader clone. As the MB poster campaign used to state: 'If you think you've mastered video games, we have some bad news for you.'

GORDON LAING

www.monmouth.com/~pcjohn/